COAL AGE

Devoted to the Operating, Technical and Business Problems of the Coal Mining Industry

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Alabama Coal And the NEW Industrial South

ALABAMA'S COAL INDUSTRY typifies the spirit of the New Industrial South—the South where whirr of spindle, hum of loom and hiss of molten metal join in announcing that the day when agricultural pursuits alone were the basis of material wealth and prosperity in the states below the Mason and Dixon line has vanished. Cotton grown in the uplands of the Mississippi Valley is now being fabricated close to the fields where it blossoms—in many cases with machinery wrought out of the ores from Red Mountain. Diversification in industrial activity is growing apace; in the Birmingham district alone the number of distinct products manufactured has jumped from 475 in 1900 to over 2,000 last year.

THE FOUNDATION of this expanding material wealth and diversification rests upon the opulence of Nature in placing coal, iron ore and limestone on the very doorstep of Birmingham. We feel a justifiable pride in a stewardship that has neither wasted nor buried the talents intrusted to our care. Just as the early development of these resources tested the stamina of the reconstruction day pioneers whose faith and courage established credit for struggling industry when cold-eyed doubters hesitated to advance cash, so the economic recovery and the efficient utilization of these same resources have been a challenge to the engineering skill of those who followed. Alabama's record of pioneering in coal preparation and cleaning is worthy to stand beside its record of pioneering in development.

INTEREST in the broader phases of promoting the industrialization of the New South, however, has not diverted Alabama coal operators from their responsibilities to the men employed at their mines. Operators with vision have a keen realization of the necessity of making the mines safer places in which to work and the mining camps better communities in which to live. Alabama shares with Montana the distinction of being the first to found a chapter of the Holmes Safety Association. The operators have anticipated laws in the adoption of safety measures. Accident prevention is a major consideration.

BETTER houses, better sanitation, modern lighting, proper and adequate recreation facilities are part and parcel of the program of the Alabama coal industry. No effort is being spared to raise the standards of living so that material welfare may encourage intellectual expansion and spiritual growth. Through direct contributions many operators are making possible educational advantages to the children of miners which appropriations from state funds do not provide. The result of these efforts is seen in contented labor and happy mining communities.

Hugh Morrow

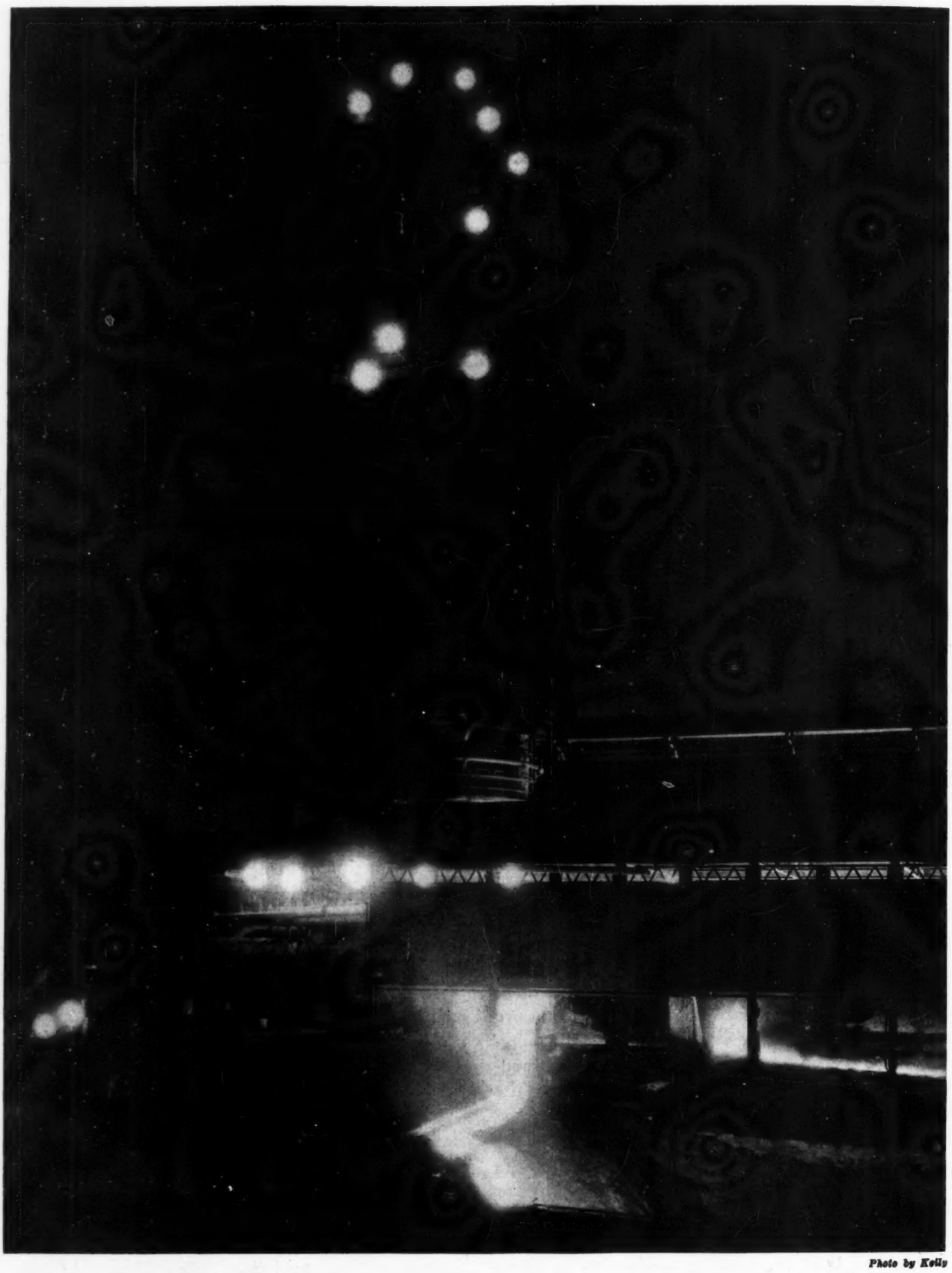

Photo by Kelly

Where Alabama Coal, Iron and Limestone Meet

City Furnace, Birmingham, At Night

The Coal Field That Underwrote Birmingham's Industrial Activity

By R. Dawson Hall
Engineering Editor, Coal Age

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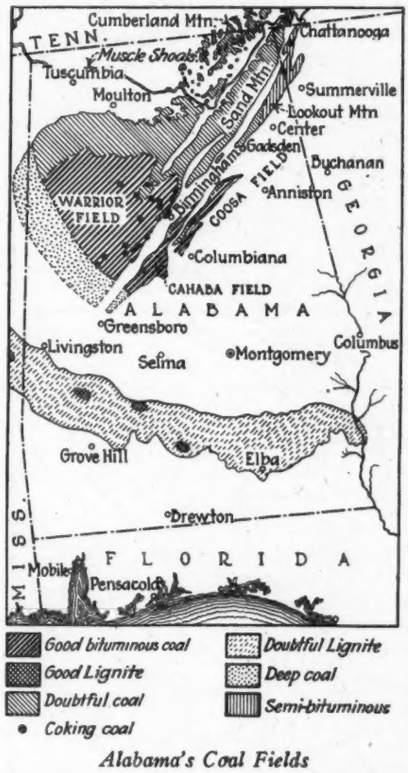
IN THE northern part of the Appalachian coal field, which stretches from Pennsylvania to Alabama paralleling the Atlantic Coast, the productive coal measures cover an area that is 185 miles wide, but as one proceeds southward they decrease in width until at the northern boundary of Tennessee the area is barely 60 miles across. When the measures reach the northern line of the State of Alabama they contain little workable coal and are scarcely 40 miles in width. Here the coal does not lie in as deep a trough as in the northern field and so is cut up by numerous streams. As a result, the coal field has become so unimportant that the inhabitants of Chattanooga and neighboring points are almost oblivious of the coal field in which they dwell.

On entering Alabama the coal field widens, but it does so to little advantage. The Plateau coal field is almost without value—at least, at present. In the "Geological Survey of Alabama" it is stated that "In the Plateau field at least one bed in Blount Mountain and one in Lookout Mountain are of workable thickness, and in Sand Mountain and the residual knobs of Sequatchie Valley one bed, at least, is locally workable." As a clean coal 30 in. thick is regarded as "workable" by the authors, the record of the Plateau field is not inviting.

A hundred miles of relative sterility greets one as one travels from Chattanooga toward Birmingham; for this distance the coal field is neither wide nor operable. Cumberland Mountain, Sand Mountain, Raccoon Mountain and Lookout Mountain have coal measures but hardly any merchantable coal. The seams are full of pockets, irregular and uncertain. When furnaces were built to the north and east of Birmingham in the expectation of deriving sufficient and suitable fuel supplies the results were disappointing.

Just as the Appalachian field seems destined to come to an inglorious end comes a sudden widening of the field. From 50 miles in width it becomes perhaps nearly 100 miles. The measures even appear to extend over the state line into Mississippi. This widening, however, is not known to be of long duration. The whole Appalachian area measures 820 miles along its greatest dimension north and south. Of this length the proved Warrior field of Alabama constitutes only about 45 miles. Beyond it is a hidden coal territory the extent of which is not known. In Alabama, therefore, the Appalachian field both revives and disappears.



Alabama's Coal Fields

Further toward the south is a lignite field that runs across the state unaffected by the disturbances of the bituminous field to the north (regarding which dislocations more later must be said). This lignite deposit is an outlier of the great Gulf Province field which is found covering a large part of Texas, Louisiana, Arkansas, Mississippi as well as small parts of Alabama, Tennessee, Kentucky and even Missouri, the boundaries of which are none too well known.

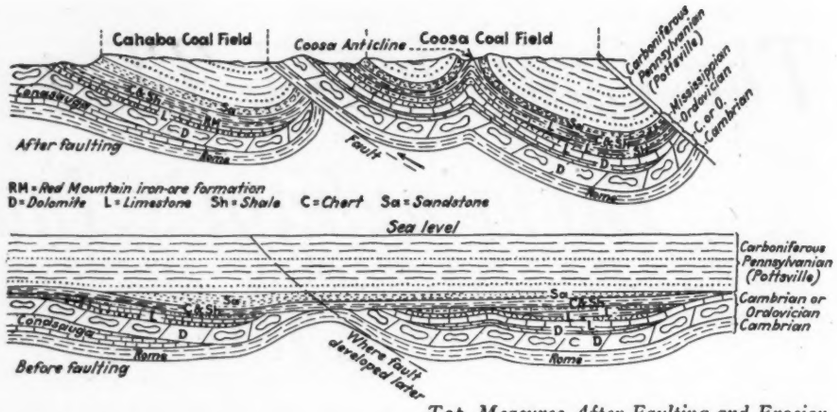
THIS lignite is not of Carboniferous Age but, according to Marius R. Campbell, is part of the uppermost Cretaceous and lowermost Tertiary rocks, which were laid down much later. The earth movements that made the greater dimension of the Appalachian region run northeast and southwest were no longer in operation when these lignite beds were laid down.

To return to the Appalachian field, it may be said that the mountain-forming action in the north, while extremely violent, folded the measures without fracturing them. In the Pennsylvania bituminous coal field there is only one little 70-ft. fault, in what is known as the First Bituminous basin, but the folds caused by pressure extend in gradually diminishing intensity from the Appalachian front to the Ohio line and beyond.

The result of the folding was heat,

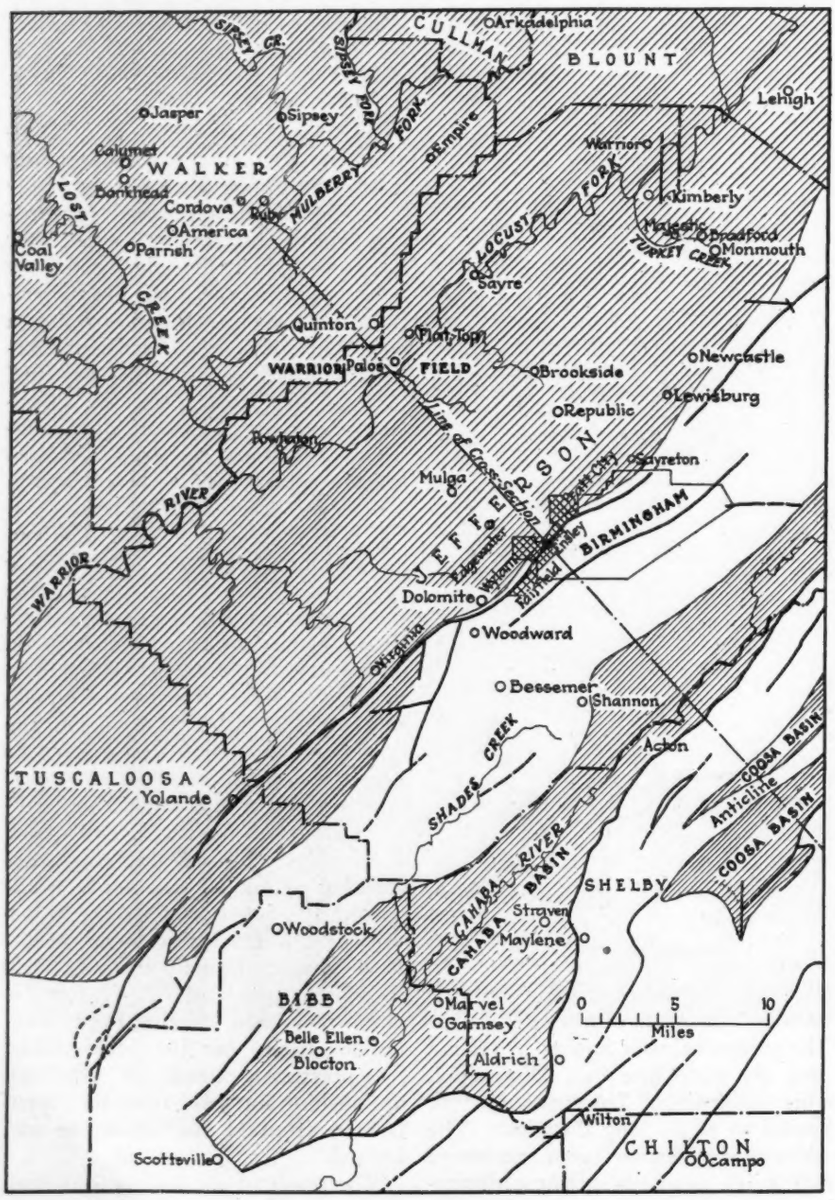
and from heat came metamorphism. The heat turned peat or perhaps lignite into bituminous coal. There was no escape found from the heavy pressures of the big Nittany mountains. But in Alabama and Tennessee it seems that the measures gave way before the complete metamorphism occurred. Tremendous faults relieved the strain. For this reason the coal advanced only to the bituminous stage, except on Lookout Mountain in the Plateau field of Alabama and Georgia, where it became semi-bituminous.

In the northern end of the Appalachian region the measures rise in the southeastern direction till they leave the hill tops. They have been terminated by erosion. In the Tennessee fields they are cut off by a fault. The beds of the Warrior coal field in Alabama are similarly cut off, though in some places the fault lifted them and erosion followed. This fault brings up the Conasauga formation in the Upper Cambrian to the level of the coal. Thus all the Ordovician, Silurian and Devonian measures, in so far as present, with that part of the Carboniferous measures known as the Mississippian must have been lifted on the eastern edge of the fault to the level of the coal measures and then must have been eroded.



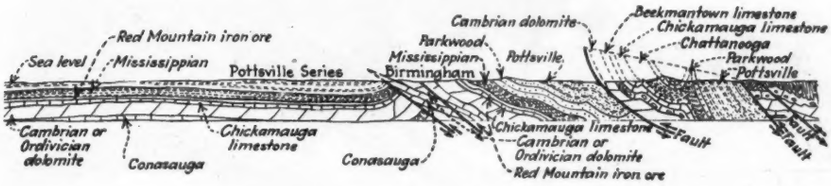
Top, Measures After Faulting and Erosion. Bottom, Same Before Faulting

Coal Fields Near Birmingham; Heavy Lines Show Faults



THE mind can hardly contemplate such a catalysm, if such it was. The dislocations, however, may have occurred by degrees in the course of centuries or millenniums. However, it must be remembered that the Ordovician, Silurian and Devonian measures were relatively thin at the site of the fault. Indeed it may have been that their thinness had something to do with its occurrence. On the other hand, the newer and less consolidated Parkwood sandstones and Pottsville formations were abnormally thick, as probably also were whatever measures lay above them at that time, for they doubtless were overlaid by other Carboniferous deposits.

The coal measures on the eastern side of the fault, of course, were lifted several thousand feet and in consequence were eroded away, as also were the beds under them. But the coal measures that lay away from the fault to the east were not lifted nearly as much and so the coal seams tilted in that direction. Some of them probably were eroded, for the upper part of the Pottsville formation is not now to be found in Alabama. Much of the lower Pottsville escaped erosion and is there yet. It forms the Cahaba coal field. The strong dip of this field to the east is thus readily explained. The fault, in fact, seems to have been much like an anticline. On the west the measures sometimes incline up toward it and on the east they do so everywhere.



Cross-Section at Location Shown in Map on Page 588

But another fault occurred further to the east, where the Silurian is perhaps absent and the measures of other ages are quite thin. This brought the Rome beds to light, a formation just below the Conasauga. Again the measures were tilted and again a portion of the Pottsville formation—a large portion this time—was left to form the Coosa coal field.

THIS Coosa district was folded badly before it was lifted, probably far more than at the time represented by the lower cross-section in the upper figure on page 588, though its back may have been broken when the fault occurred. However, it developed an anticline, and that upward flexure, since eroded, forms a sterile streak up the center of the Coosa coal field.

The coals of Alabama are all in the Pottsville Series, which contains, as will be remembered, the Lykens coals of the anthracite region, the Mercer, or Alton, and the Sharon, or Marshburg, coals of Pennsylvania and that great wealth of coals, the Kanawha, New River and Pocahontas groups in West Virginia. The Lykens coals are unusually free from ash.

The Kanawha, New River and Pocahontas coals have a high reputation, and the Alabama coals would stand with the best where thick if it were not for their many and big binders. These can be removed from the product by washing.

The most extensive field in Alabama and the most valuable in consequence is the Warrior. It has been faulted locally. In one mine is a fault with a throw which at its greatest profundity reaches 177 ft. The field, however, has not been *folded* as much as those in other areas. For this reason the fuel ratio does not vary markedly from end to end of the field, and it apparently is the custom in Alabama to talk of the volatile content of a given bed rather than to speak, as in other states, of the ruling volatile content of all the coals to be found in a certain locality (excluding, of course, in such cases all unusual coals such as cannel.)

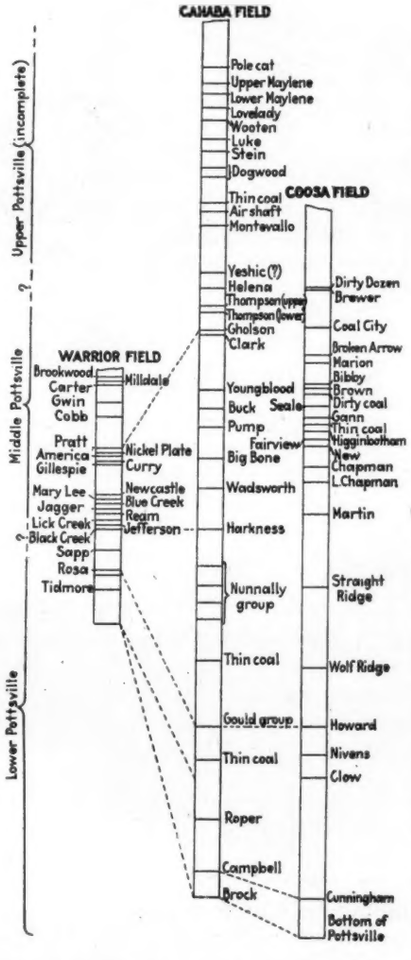
In the Warrior field the lowest commercial bed, geologically speaking, is the Black Creek, which is so low in ash and in sulphur that it makes an ideal coal for byproduct coke. It is said that at some mines the coal can be washed to give a 3 per cent ash content and a sulphur content of 0.5 per cent.

In one mine operating the Black Creek seam not more than 30 per cent of the coal area is thick enough to mine, though the coal is extracted wherever the seam is 20 in. thick or over. The entries are driven regardless of seam thickness, and oftentimes the coal is less than a foot thick. Fortunately the coal, as it is used for byproduct ovens, is just as valuable if it is brought out as slack. This seam is said to attain in some sections a thickness of 42 in.

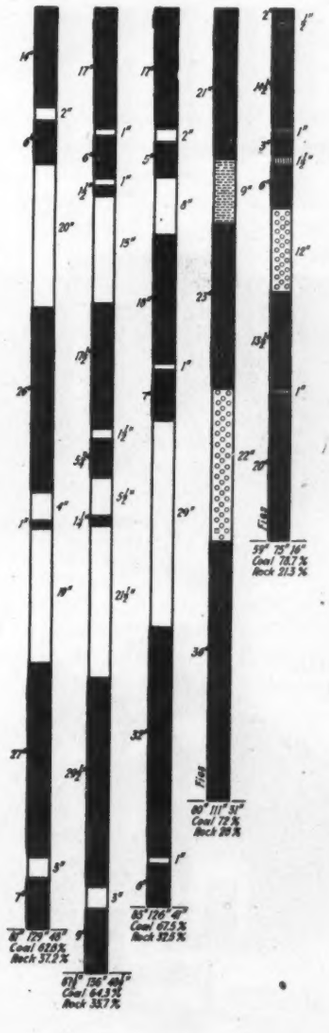
NEGLECTING the seams of minor importance, the next above are the Blue Creek seam, which while it has several binders in its 6 to 10 ft. of thickness, is an excellent coal bed, and the Mary Lee, which usually is a thick seam with a large quantity of impurity, including a heavy and hard "middleman" which may be 22 in. thick and may be found dwindled down, as at the Parrish mine of the Railway Fuel Co., to a mere 3½ to 6 in. Nor is this all; there is a "boy rock"—sometimes more than one. The "boy" may grow to the healthy maturity of 6 in. where the "middleman" is thick, thus dividing up the upper bench of coal. Sometimes the bench under the "middleman" is so thin that it is left. It may hardly permit of cutting. In a seam like this a distinction is made between the coal thickness and the

(Turn to page 599)

Coal Seam Sections, Alabama



Mary Lee Sections



BIRMINGHAM

The Beautiful

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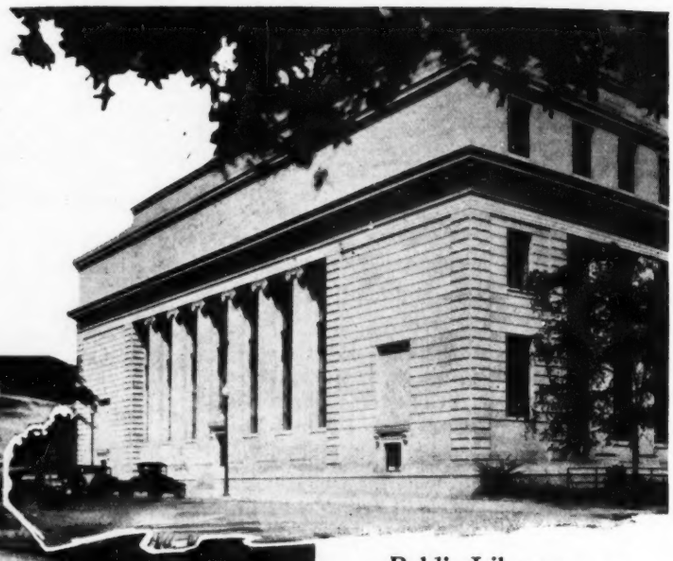
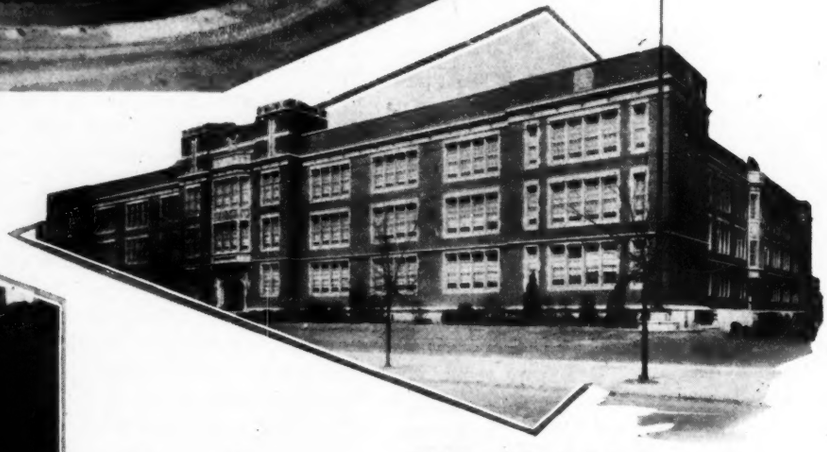


Public Library

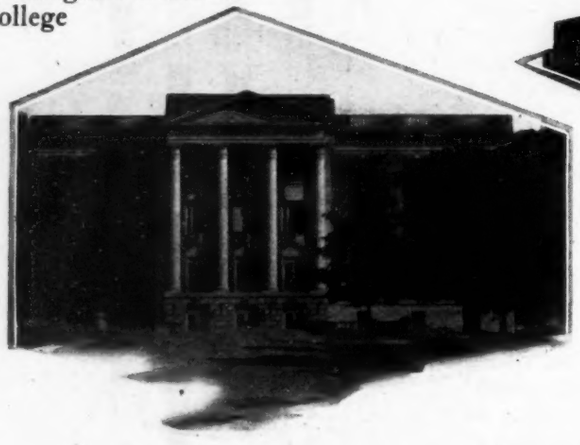
Municipal Stadium

Photo by Photo Section, 106th Observation Squadron, Alabama National Guard



Phillips High School

Birmingham-Southern College



Birmingham Country Club

The Little Theatre

© McGill Studio

Aerial View of Coal Tipple at New State Docks, Mobile, Ala.

Alabama Achieves Stabilization Despite Competitive Checks

By Sydney A. Hale
Managing Editor, Coal Age

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STEADINESS has been the outstanding characteristic of Alabama coal-production levels in recent years. Throughout a period when the tonnage trends in other major bituminous fields east of the Mississippi River have been inconstant, the volume of annual output in Alabama has been stabilized to an unusual degree. The sharp gains made by Kentucky and West Virginia find no counterpart in the even course of Alabama production; the heavy losses in tonnage met with in some of the Northern fields likewise are not reflected in Alabama figures. The maximum variation in Alabama production between any two consecutive years since 1923 has been 6.49 per cent; the minimum, 4.48 per cent.

This stabilization has been achieved neither at the expense of sales realizations nor as the result of particularly favorable competitive conditions. While the state has not been able wholly to escape the effects of post-war readjustments in price levels, these effects have been minimized largely because the coal industry of Alabama has not sacrified all consideration of price for volume. In the past four years the average value of Alabama coal as reported by the U. S. Bureau of Mines has been higher in each year than the average for the country as a whole and higher also than the averages for all other states in the Appalachian Region.

Fluctuations in prices and tonnages in the Appalachian Region during the past five years are shown in detail in Tables I and II. Eastern Kentucky, for example, produced 41.86 per cent more coal last year than it did in 1923 but the average value declined 85c. West Virginia's output was 34.49 per cent greater but the average realization was 93c. less than in 1923. Pennsylvania, with declining production and the fillip of labor disturbances to create a livelier interest in prices last year, reported a decrease of 70c. in average values. Ohio, too, had both falling output and falling prices.

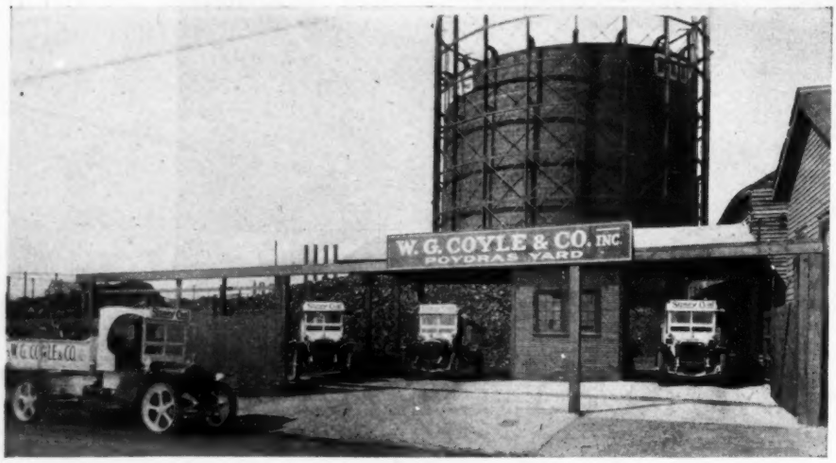
Comparing 1927 with 1923 in Alabama, production was off 3.38 per cent and the average value dropped only 27c.—or 42c. less than the decline in the national bituminous average. Moreover, in view of the high percentage of captive tonnage mined in Alabama, it is more than probable that the averages reported for that state understate the actual realizations on coal sold commercially. Circular prices on the better-known domestic grades produced in Alabama are among the highest quoted on this class of bituminous business in the United States and are considerably above the average figures on such coal east of the Mississippi River.

The large volume of captive ton-

Table I—Production Fluctuations in Appalachian Region and Eastern Interior Basin: 1923-1927

	1923 Net Tons	1924 Net Tons	1925 Net Tons	1926 Net Tons	1927 Net Tons
Alabama	20,457,649	19,130,184	20,004,395	21,000,962	19,765,860
Eastern Kentucky	33,780,553	36,127,133	42,882,113	47,460,439	47,919,408
Maryland	2,285,926	2,133,703	2,694,572	3,078,353	2,814,842
Ohio	40,546,443	30,473,007	28,034,112	27,872,488	15,799,697
Pennsylvania	171,879,913	130,633,773	136,928,019	153,041,638	133,141,639
Tennessee	6,040,268	4,556,555	5,454,011	5,788,741	5,783,367
Virginia	11,761,643	10,693,464	12,799,443	14,133,386	12,916,042
West Virginia	107,899,941	101,662,897	122,380,959	143,509,340	145,122,447
Illinois	79,310,075	68,323,281	66,909,359	69,366,923	46,848,224
Indiana	26,229,099	21,480,213	21,224,966	23,186,006	17,935,758
Western Kentucky	10,890,279	9,020,071	12,186,557	15,464,023	21,204,590
United States	564,564,662	483,686,538	520,052,741	573,366,985	517,763,352

nage undoubtedly has contributed materially to the stabilization in production for the state as a whole. But there also has been stabilization on the commercial side of the market in the face of difficulties fully comparable to any embarrassing other coal-producing districts in the eastern half of the United States. Competition from Kentucky and the Virginias has checked expansion to the north; natural gas has curtailed markets in the Southwest; fuel oil has taken its toll of bunker business at the Gulf ports. In markets nearer home hydro-electric power has deprived Alabama mines of a large share of the benefits of the rapid industrialization of the Southeast.



The average New Orleans family burns 1 to 1.5 tons of coal a year—but wants coal when it wants it. The DeBardeleben Coal Corporation meets the want with its own retail yards.

Captive tonnage makes up 44 to 50 per cent of the output of the state. By far the greater part of this controlled tonnage is produced by the iron and steel interests operating ore mines and blast furnaces in the Birmingham district. This group includes the Tennessee Coal, Iron & Railroad Co., Sloss-Sheffield Steel & Iron Co., Woodward Iron Co., Gulf States Steel Co., Republic Iron & Steel Co. and the Central Iron & Coal Co., operating 27 mines with a production last year of 7,406,221 tons. Little of this tonnage reaches the commercial market; one company sells between 30,000 and 40,000 tons monthly and some is sold to employees, but the total for the group probably does not exceed 500,000 tons per annum.

Outside the iron and steel group the more important captive tonnage interests are the Railway Fuel Co., a subsidiary of the Southern Ry. system, and the mine of the Southeastern Fuel Co., the output of which has been taken by the Alabama Power Co. for several years. The Alabama By-Products Corporation, with 13 mines, produced 2,124,459 tons in 1927, of which 531,873 tons was made into coke at the ovens of the corporation. In the estimates of captive tonnage shown in Table III only that portion of the coal coked by the company is classified as non-commercial.

The coke so made is sold commercially, entering most of the states of the Union. It competes with foreign coke on the West Coast and has displaced some anthracite in Cuba. The fact that the ovens are not compelled to haul most of the raw coal several hundred miles enables the Alabama product to enter the Middle West in competition with ovens at Chicago, Detroit, Chattanooga and other large consuming points. The corporation has recently organized a subsidiary company to push the sale of coke for domestic fuel in the Birmingham district.

Competition from Kentucky, Tennessee and West Virginia is an effective barrier to the sale of steam coal in the Carolinas; eastern Kentucky, a small tonnage of which comes into retail yards in Birmingham, is a factor limiting domestic sales. Eastern Kentucky also is an active bidder for domestic business at Montgomery. The area of distribution for domestic grades of Alabama coal, however, is much wider than that of steam fuel. To a large extent western Kentucky has not only eliminated southern Illinois as a competitor of Alabama in the lower Mississippi Valley but north of Huntsville it also has driven Alabama from many of the private power plants.

Natural gas has taken away considerable domestic business in the Southwest—particularly in the Texas belt beginning at San Antonio and including Beaumont, Dallas and Galveston. Not a coal stove was sold in the city of Beaumont last year. Gas is piped in Louisiana and lines also serve Vicksburg, Natchez and Meridian. The natural-gas interests also threaten to enter Birmingham itself. A bond issue of $6,300,000 was floated last month to complete the construction of a pipe line from the Monroe field in Louisiana to Memphis to supply the gas requirements of Memphis and intervening territory in Arkansas and Mississippi.

Fuel-oil competition has been felt most at the Gulf ports, cutting the coal sold for bunkers from approximately 1,000,000 tons some years ago to half that quantity. Only an occasional vessel of the U. S. Shipping Board takes coal but about 80 per cent of the United Fruit fleet and foreign bottoms calling at the Gulf ports still bunker with coal. The American Sugar Refinery plant at New Orleans continues on coal, as does the Mobile Light & Railway Co. The Public Service Co. of Louisiana, heretofore an important coal consumer, is now said to be planning to use oil, gas and coal. On the whole the fuel-oil menace to the industrial market, while still present, appears less terrifying although recent low quotations on oil cause concern.

It is in the activity of the hydro-electric public utilities, however, that the Alabama operators find the strongest challenge to the expansion of their markets for industrial coal. Out of 1,867,079,000 kw.-hr. produced by Alabama public-utility power plants last year, 82.1 per cent was hydro-electrically generated. In Georgia water power accounted for 86.8 per cent of an output of 709,664,000 kw.-hr. In the Carolinas 50.83 per cent of a total of 3,202,399,000 kw.-hr. was produced hydro-electrically. The public-utility power plants in these four states consumed 1,552,372 tons of coal.

The situation is more favorable to coal in Florida, Louisiana and Mississippi. These states reported a

*Table II—Average Value per Ton, Bituminous Coal: 1923-1927**

	1923	1924	1925	1926	1927
Alabama	$2.52	$2.34	$2.12	$2.29	$2.25
Eastern Kentucky	2.66	1.90	1.80	1.87	1.81
Maryland	3.02	2.17	1.97	2.21	2.07
Ohio	2.43	2.03	1.93	1.96	1.92
Pennsylvania	2.75	2.26	2.10	2.13	2.05
Tennessee	2.73	2.13	1.85	1.90	1.84
Virginia	2.76	2.04	1.84	1.92	1.80
West Virginia	2.65	1.82	1.71	1.84	1.72
United States	2.68	2.20	2.04	2.06	1.99

*U. S. Bureau of Mines reports.

public-utility power-plant production of 1,260,592,000 kw.-hr. last year. No power was hydro-electrically generated in Louisiana or Mississippi and only 1.8 per cent in Florida. The public-utility power plants in these states consumed 361,097 tons of coal. Their combined kilowatt-hour output was only 21.81 per cent of that of the four states mentioned in the preceding paragraph. Texas, with a public-utility power plant output of 1,839,466,000 kw.-hr. and a coal consumption of 658,209 tons, draws but little upon Alabama for fuel of any kind.

Domination of the industrial market tributary to Alabama coal by the hydro-electric public-utility interests leaves the operators of the state to scramble for the business of the smaller low-pressure steam plants, the car-a-week buyer and those industries in which coal also is used in process

*Table III—Captive and Commercial Output of Alabama**

Year	Commercial (Net Tons)	Captive† (Net Tons)	Total (Net Tons)
1923.....	12,340,626	8,578,677	20,919,303
1924.....	10,912,814	8,703,117	19,615,931
1925.....	10,944,236	9,464,420	20,408,656
1926.....	11,745,656	9,763,156	21,508,812
1927.....	11,226,107	8,964,819	20,190,926
Average....	11,433,888	9,094,838	20,528,726

*Based on Alabama state reports.
†Includes tonnage coked by Alabama By-Products Corporation and also tonnage sold commercially by captive mines; this latter quantity does not exceed 500,000 tons per annum, it is estimated.

work, such as cotton-oil mills and cotton mills where coal is needed to heat the dyes. Optimisitc producers, however, believe that the day is not far distant when there will be a revival of interest in large private power plants in the South. In the meantime more interest is being displayed in powdered-coal installations —particularly in smaller plants.

From the standpoint of tonnage consumed the railroads rank second to the iron and steel interests in the Alabama coal-marketing picture. Forty per cent or more of the output of the state is used by the last-named group. Railroad consumption, which has declined somewhat in the last year or so due to buying in other fields and greater use of fuel oils, absorbs between 25 and 30 per cent of the production of the state. With the exception of the Southern Ry., which takes approximately 30 per cent of its Alabama supply from the mine of the Railway Fuel Co. at Parrish, the tonnage used by the big lines traversing this section of the country is purchased in the commercial market. Railroad consumption of Alabama coal is now estimated at 5,225,000 tons per annum.

The best data available indicate

Table IV—Production of Alabama Coal by Sizes: 1923-1927

	1923		1924		1925		1926		1927	
	Tons	Per Cent*	Tons	Per Cent*	Tons	Per Cent*	Tons	Per Cent*	Tons	Per Cent*
Fancy lump....	1,199,030	5.73	1,376,817	7.02	1,112,833	5.45	1,590,786	7.39	1,346,017	6.67
No. 1 Lump....	252,518	1.27	157,072	0.80	441,630	2.16	84,173	0.39	107,273	0.53
No. 2 Lump....	40,261	0.19	122,513	0.62	88,718	0.43	246,263	1.14	256,888	1.27
Egg										
Dry.....	249,162	1.14	232,316	1.18	222,672	1.09	230,100	1.07	237,063	1.17
Washed.....	86,615	0.41	163,364	0.83	302,262	1.47	168,996	0.79	141,218	0.70
Nut										
Dry.....	182,335	0.87	121,222	0.62	107,082	0.52	59,374	0.28	8,093	0.04
Washed.....	455,659	2.13	604,977	3.08	512,283	2.51	392,368	1.82	458,291	2.27
Slack										
Dry.....	236,847	1.13	168,582	0.86	164,169	0.80	324,599	1.51	254,365	1.26
Washed.....	2,161,186	10.33	3,431,707	17.49	6,104,247	29.91	3,898,662	18.13	4,966,473	24.60
Mine-Run										
Dry.....	5,900,651	28.21	4,849,804	24.72	5,582,406	27.35	4,140,009	19.25	3,322,015	16.45
Washed.....	10,155,039	48.55	8,387,577	42.76	5,770,354	28.27	10,373,482	48.23	9,093,230	45.04

*Per cent of total output.

that between 1,500,000 and 2,000,000 tons of Alabama coal reaches the domestic consumer and the small steam plants served by the retail dealers. Territorially this coal is able to penetrate markets from which competition of one sort or another has driven the industrial grades, although the exploitation of natural-gas resources has seriously affected shipments to Texas and threatens domestic sales in other states. Alabama domestic coal is sold in Memphis. It enters markets in Arkansas, Georgia, Louisiana, Mississippi and southwestern Missouri. Montevallo coal is still a factor in the Carolinas despite West Virginia competition.

Producers specializing in the sale of domestic coal have perfected merchandising systems superior to those employed in many competing fields. Some of the smaller companies probably spend more per ton in promotional work than any other coal group in the United States. That these expenditures pay is shown in the realizations received, the price stabilization under which leading brands are sold on a sliding scale and the fact that in dull seasons of the year some operators find it more profitable to store coal at the mines than to shut down or flood the market with unwanted tonnage.

Greater Birmingham, which consumes approximately 212,000 tons of domestic coal per annum, is a market for which there is keen competition. Street-car ads, newspapers, billboards and electric signs are used by the producers to sell this market for their retail distributors. A check on the response to this first type of publicity by asking the street-car reader to telephone the producer has been very satisfactory. These telephone inquiries are referred by the producer to the retail dealer whose yard is nearest the home of the prospective customer. Retail dealers are furnished with copies of the street-car ads for display so that the consumer can identfy them with the cards he has read in the cars.

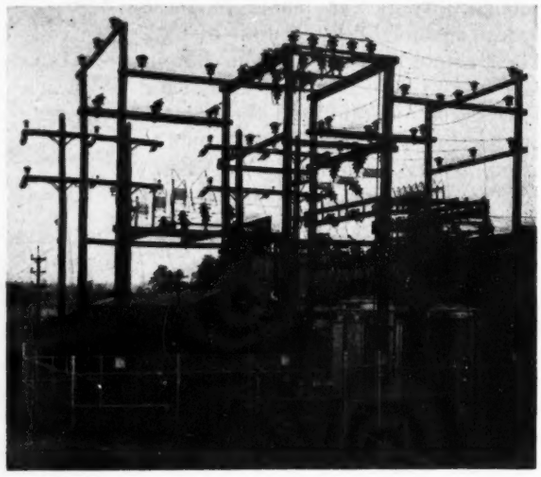
One company is using an extensive newspaper campaign throughout the territory served by its retail distributors. Originally considerable copy was placed in newspapers in the larger cities but this plan has been abandoned for the wider and more intensive coverage possible in the dailies and weeklies circulating in the smaller communities. At the present

Mine Storage Is Growing in Favor with Alabama Domestic Coal Producers

(Turn to page 601)

POWER *and* MAINTENANCE

Under Centralized Control



By A. F. Elliott

General Master Mechanic and Chief Electrician, Sloss-Sheffield Steel & Iron Co., Birmingham, Ala.

◆

ELECTRICAL and mechanical practices at coal mines of the Sloss-Sheffield Steel & Iron Co. have been influenced by the fact that the work is supervised by a chief electrician and master mechanic who also handles the consulting electrical work and the construction and maintenance at the furnace plant, power stations and iron-ore mines.

Thus the whole is unified so that there is opportunity to plan the installations and supervise the operations to the best advantage of the company's power generation and distribution system as a whole.

Of the five operating coal mines all but the Searles mine are fed by an interconnected power system tied in with the Alabama Power Co. This tie line is kept connected so that power flows from one system to the other as conditions of load and generation demand. The Searles mine, which is 40 miles from the nearest of the group, is supplied exclusively by the Alabama Power Co.

The four mines forming the group are Blossburg, Bessie, Flat Top and Lewisburg. The fact that all are gassy has influenced the design of the power system. Fifty miles of 44,000-volt transmission line and several short 6,600-volt and 2,300-volt lines connect the coal mines, ore mines, quarries, coke plant and furnace plants. The longest line is 27 miles. Double wood-pole construction is used for the 44,000-volt lines and all poles, including low voltage lines, are creosoted. The conductors of the 44,000-volt lines are aluminum with steel centers. The pole spacing is 450 to 1,400 ft., depending on the topography of the country.

Four Sloss-Sheffield plants have a generating capacity of 16,100 kw. The plant at Flat Top mine, which consists of two 750-kw. turbo-generators, is held as a reserve unit.

At the City Furnace plant in Birmingham, one 3,000-kw. turbo-generator operates continously on exhaust steam from the blowing engines. At the North Birmingham furnace plant two units, 2,000 and 600-kw. capacity operate under the same conditions.

The North Birmingham byproduct plant has three turbo-generators operating on 210-lb. and, 150-deg. superheat. Two are rated at 2,000 kw. each and the third at 5,000 kw. In this boiler plant coke breeze, coke-oven gas and pulverized coal are used.

Only the gas over that supplied to the city of Birmingham is available to the power plant. Of the six boilers, two are fired with coke-oven gas, two with coke breeze, one with coke breeze and coal, and three with coke-oven gas and powdered coal.

The turbines operating on exhaust steam are run as base load machines at unity power factor, receiving wattless current from the generators driven by steam made from solid fuel.

The power exchange contract with the Alabama Power Co. providing a night kilowatt-hour rate one-half that during the day justifies the Sloss Company in supplementing the gas and coke-breeze fuels with coal during the day but not at night. This condition and the desirability of completely using the varying surplus of gas and the varying supply of coke breeze requires careful operation of the power system in order to obtain the best over-all economy.

In a typical month 6,846,000 kw.-hr. was generated, 2,639,000 kw.-hr. being sold to cement plants, approximately 300,000 kw.-hr. to the Alabama Power Co., and 1,290,000 kw.-hr. used at the four coal mines. Distribution percentages for the month at Bessie mine, which is typical of the others, were as follows: haulage, 35; ventilation, 17; drainage, 13; dwellings, 1; commissary, 1; mining machines, 10; miscellaneous lighting, 1, and washer, 22.

The transformer substation at Bessie consists of one 1,500 kva. 44,000/2,300-volt and one 600 kva. 44,000/6,600-volt transformer. The 1,500-kva. supplies the main hoist fan, washer, slate hoist, river pump station and the lighting. The 600-kva. unit supplies lines leading to substation boreholes. This transformer has 2,300-volt taps for an emergency fan supply. The same arrangement is followed at the other mines.

Three of the mines are connected by a 6,600-volt loop circuit fed by the Bessie transformers, so that if one fails power may be drawn from the remaining two. Two of the mines are interconnected on the 2,300-volt side for the same reason.

Direct-current generating equipment in the substations at the four mines connected to the power company system consists of five synchronous converters and four synchronous motor-generator sets. The type of unit installed depends upon the availability of an attendant.

Transformers are excluded from the inside of the mines when practical so if an inside substation is necessary motor generators are used to simplify the attendance problem. Outside substation locations are preferred, however, especially if they are near a fan or other equipment, with an at-

tendant who can mind the substation also. Synchronous converters are used in the outside substation.

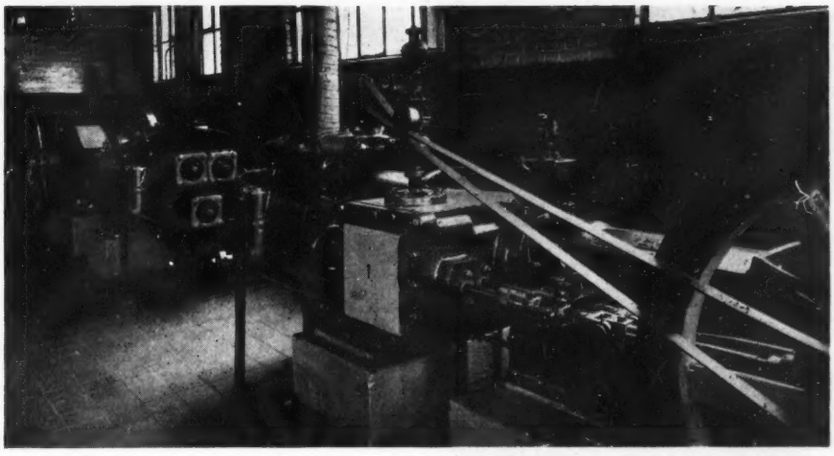
The few transformers that are installed inside of the mines, are housed in fireproof concrete vaults or rooms with circulation to the return air.

Automatic reclosing circuit breakers are used on the d.-c. feeders, but no full-automatic control equipment has been installed because all substations are so located that no saving in attendance cost would result. Full-automatic control is being purchased for one substation where changed conditions will permit dispensing with an attendant.

Slip-ring induction motors are used on the slope hoists, the largest being 700-hp. Liquid rheostat control is preferred. Generally speaking, rope haulage rather than locomotive haulage is used on main slopes averaging over 3 per cent grade.

All mine fans excepting the one near the Flat Top power plant, which is driven by an engine and motor together, have electric drives. At Flat Top the engine serves as a standby unit, just enough steam being admitted to provide proper cushioning. Most of the fan motors below 100 hp. are squirrel-cage, and those above are slip-ring and equipped with automatic starters. The fan at Bessie mine is equipped with a synchronous motor. This new and rather unusual installation is described in another article.

New installations are carefully studied to improve the power factor of the system. At one iron-ore mine the 1,500-hp. slip-ring motor driving the main hoist is interconnected through relays with a 1,000-hp. synchronous motor driving a large air compressor so as to operate the unloading device on the compressor during hoist acceleration. Peak load is reduced and the large synchronous motor runs at practically no load and with full field. Full voltage results and the power factor is above 80 per cent at that mine.

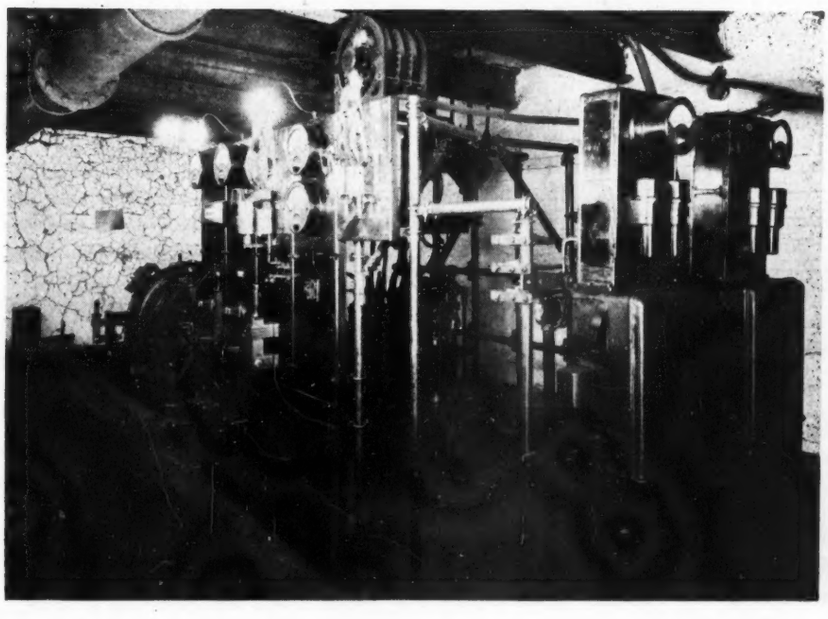


Worthington Laidlaw Compressors

Mechanical connection between the motors and fans has not been standardized. The two largest fans have silent chains equipped with oil pumps. Others have long belts. Specific conditions govern the selection.

It is the practice to use 2,300 volts on all stationary motors of over 30 hp. Sizes below this are wound for 220 or 240 volts. Most of the motors in tipples and washers are of the slip-ring type, although squirrel-cage motors are used to drive conveyor belts and centrifugal pumps.

Automatic Reclosing Circuit Breakers



Mine locomotive equipment consists of haulage motors up to 15 tons and gathering motors equipped with cable reels. In addition Bessie mine uses three combination trolley and battery locomotives. Permissible cutting machines and permissible locomotives have not been installed to date.

Maintenance of coal mine equipment is supervised by the local chief electricians, who report to the mine superintendents and whose work must be approved by the general master mechanic and chief electrician.

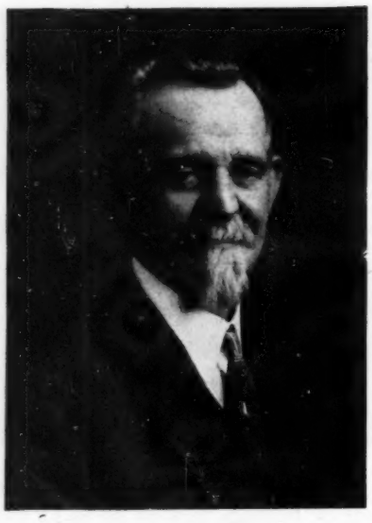
No central repair shop has been set up but the larger mines are completely equipped. Each plant has a combination repairman and armature winder who winds all d.-c. armatures. A.-c. motors are sent to a commercial shop.

Electrical construction is handled by a construction foreman reporting to the general master mechanic and chief electrician. Sufficient work warrants practically continuous employment of such a foreman.

The power-house men report through the power engineer, who is responsible for all power stations and transmission lines up to and including the step-down transformers at the various operations. All switching, load dispatching, and so on is handled by the power engineer or the chief operator.

Transmission lines are regularly patrolled and inspected by the line foreman, who is furnished with a truck equipped for emergency service and a driver, lineman and helpers. The local chief electrician at each mine is responsible for the maintenance and operation of the equipment from the 2,300-volt service only.

One man is in charge of both electrical and mechanical equipment at each operation, eliminating friction from overlapping authority and allowing operation with fewer men.



P. B. Thomas

Linking the Past To the Present

ALABAMA PIONEERS

T. H. Aldrich

THE hardy industrial pioneers who laid the foundations for the rehabilitation of the South by developing the coal, iron and limestone resources of Alabama in the dark days following the Civil War are a vanishing race. Col. J. W. Sloss lives in the name of the company he started. A second and a third generation carry on the DeBardeleben tradition. James Bowron was gathered unto his fathers late in the summer. One by one the pioneers have disappeared over the hill until now only two leaders remain who can speak from personal knowledge of the drama of awakening Alabama to its industrial possibilities.

One of this twain—Truman Heminway Aldrich—is still actively engaged in mining pursuits; the other —Peter Bellis Thomas—has left the field to his sons while he devotes his immediate attention to real estate ventures. Mr. Aldrich, mining engineer, banker, coal operator, iron and steel entrepreneur and consulting engineer, was born in Palmyra, N. Y., in 1848. Mr. Thomas, child of the anthracite region and first to introduce longwall mining into Alabama, was ushered into the world three years later at Easton, Pa.

In 1871 Mr. Aldrich, a graduate of the class of '69 at Rensselaer Polytechnic Institute, went to Alabama, engaged in banking and soon found himself in the coal business with the Montevallo mine as his first operation. The mine was leased on a royalty basis of 60c. per ton and coal was shipped out over a railroad owning three miles of track which consisted of strap rails fastened to 6x8 timbers. The operating season ran from Oct. 1 to March 1 until Mr. Aldrich conceived the idea of working all year, storing coal at the mine in the summer months. The workers agreed to wait for their wages until winter sales had been made, the company supplying them with foodstuffs in the meantime.

Mr. Aldrich's first big contract resulted in a loss of $1,500 on the sale of 1,200 tons to the Navy and for a time threatened to be a complete loss. Freight of $3.25 per ton from the mine to Pensacola had to be paid piecemeal in advance to the railroads making up the route. After the coal had arrived Mr. Aldrich discovered that the naval vessels drew too much water to reach the dock so he had to charter a barge to complete delivery and hire men to break up the large lumps which were his pride in order to get the coal through the small holes leading to the bunkers. Not having received a formal order for the coal, Mr. Aldrich was finally compelled to appeal to Secretary of the Navy George M. Robeson before the government paid for the shipment.

During his operating career Mr. Aldrich opened over 30 mines in the state. In association with Colonel Sloss and H. F. DeBardeleben he organized the Pratt Coal & Coke Co., producing the first furnace coke made in Alabama. At one time he was president of the Sloss company and at another period vice-president and general manager of the Tennessee Coal, Iron & Railroad Co. Since 1913 Mr. Aldrich has devoted his time to consulting engineering.

While still in his teens Mr. Thomas started work in the mines at Mt. Pleasant. His next job was with the Honeybrook Coal Co. Later he went to the Audrendried colliery of the Lehigh & Wilkes-Barre Coal Co. At Audrendried he met Miss Mary A. Jones, who consented to change her name for another good Welsh patronymic. From this union four sons were born—Howard J., now general superintendent of mines, Sloss-Sheffield Steel Co.; Darius A., president, Montevallo Mining Co.; Truman A., named after Mr. Aldrich and now in the steel business, and Alden, who lost his life in a mine accident fifteen years ago.

Mr. Thomas migrated to Helena, Ala., in 1877, working first for the Eureka Co. and subsequently taking charge of the Helena mines of the Pratt Coal & Coke Co. In 1885 he was put in charge of the Blocton operations of the Cahaba Coal Mining Co. Fourteen years later he moved to Thurber, Texas, to manage the mines of the Texas & Pacific Coal Co., returning to Blocton the next year to enlarged responsibilities ending with the general superintendency of the Cahaba company. He resigned from that connection in 1894 when the company was consolidated with the Tennessee Coal, Iron & Railroad Co.

The next year, in association with Mr. Aldrich, he organized the Cahaba Southern Mining Co., developing the Hargrove property, which he sold out in 1903 to Daniel Pearson and associates of New Jersey. Two years later he and Mr. Aldrich purchased the Aldrich mine, near Montevallo, operating this property until its sale in 1913 to W. F. Lowell and H. L. Ballin. This mine, which has been shipping coal since 1856, was later purchased by his son Darius. It was at Aldrich that Mr. Thomas introduced longwall mining. Since 1913 he has been engaged in the real estate business. Although spending a large part of his time in Florida, he still keeps in touch with the coal industry.

Alabama Fields Move Toward MECHANIZATION

By R. Dawson Hall
Engineering Editor, Coal Age

THE many partings in the thick coal, in other instances the thinness of the beds and, over a portion of the area, the pitching of the seams have caused not a few Alabama operators to declare that the underground mines of that state are likely to be long on a hand-labor basis. Mechanical loading—using that term in its broadest sense as including hand loading into conveyors—might, they fear, strain unduly the capacity not only of their picking and washing equipment but of their mine cars and waste-disposal space also.

Nevertheless, the conviction grows that there is room, and even necessity, in thin coal for the introduction of equipment like conveyors and scrapers. Seams of the latter kind can hardly be worked without such aids, and many companies have come to realize that fact. Alabama should shortly introduce a large number of these conveying units. The cleanness of the thin seams makes conditions ideal for their introduction, and in the thick seams by working in benches the use of conveyors and scrapers can be made unusually helpful, even without the picking of coal on the conveyor, which is itself quite a feasible proposition. Furthermore, pitching coal lends itself nicely to scraper and conveyor operation.

STRANGE to say, it was a mine in the Cahaba field that showed the way in which longwall and conveyors could be used to make thin-coal operation feasible. Regarding that mine—the Aldrich—more is said elsewhere in this issue. It is even yet well ahead of its time. With a thin seam, heavy cover and pitching coal it sets a mark for others with like difficulties to follow.

Interesting methods of operating the Mary Lee seam at Flat Top are given in another article in this issue. Those of the Alabama By Products Corporation will now be described.

Here, as elsewhere, the Mary Lee seam has a variable cross-section. That shown in the accompanying illustration is typical of it. In this section 22 per cent of the working thickness is rock and 78 per cent coal. For this reason it has seemed desirable to clean the coal at the working face. Otherwise loading machines doubtless would have been introduced. If the rock partings could be cut out by mining machines that plan probably would have been followed, but the rock is too hard for such methods. Where the middle rock is 14 in. or more in thickness it is difficult to shoot it down except by heavy blasting, and the shots must be put in the rock itself, for blown-out shots are to be feared, the coal being soft and friable. Any heavy shooting of the rock brings down the coal, making it difficult to clean the product.

At the Ruby mine of the company, located just outside Cordova, in Walker County, the bottom bench is missing and the top bench is from 33 to 36 in. thick. It has a good top and a fairly smooth and hard bottom. In this locality also the coal seam is free from rock or rash partings. Consequently, all conditions are ideal for the mechanical loading of coal by scrapers. During 1927 and the present year Goodman Type B scraper loaders have been used with excellent results and the projected plans arrange for the entire operation of the Ruby and of the Barney mine adjacent by means of these loaders. All the coal except from narrow work will be loaded mechanically. The output will be about 2,000 tons daily.

AT FIRST the rooms were made 40 ft. wide, as in the former hand-loading system. The plan worked well though the tonnage per scraper shift was unsatisfactory, for with such a narrow face the coal brought down when the face was shot was insufficient, and the loader had to be moved so often during a shift that too much time was lost, though with good track and easy-radius turnouts at the room necks the loader could be moved from one room to another in an average of 30 minutes.

With 40-ft. rooms 30 tons could be obtained per fall and four places could be cleaned up in a shift. But this flitting in all consumed about two hours daily and required much physical labor from those who accomplished it. So the rooms were made 60 ft. wide. This increased the tonnage and decreased the physical effort. It was decided that the rooms could be made 80 ft. wide with advantage, and, though wider rooms could be maintained, this width has been adopted as best suited to the mining conditions.

In making these experiments the rooms were necked in the same manner as in hand loading. Two necks were driven about 10 ft. wide with their remote edges 40 ft. apart. When they had been driven in about 50 ft. the two necks were connected, leaving a 35-ft. entry stump. This method was altogether too slow and involved too much hand labor, especially as the rooms were only 225 ft. long. With the scraper loader the rooms were exhausted faster than they could be started.

The cost of these necks and of driving connections between them was unduly high, so that now the room which has become 80 ft. wide is opened by excavating a place 40 ft. wide in the side of the heading and widening that excavation on one side on a 45-deg. angle till the width is 80 ft. To give the requisite support to the entry four timber cribs packed with rock are placed near that roadway. In this way the speed of preparing places is increased and the cost of hand work reduced, for there is less of it and none of it is narrow.

With this arrangement, however, the management was still not satisfied.

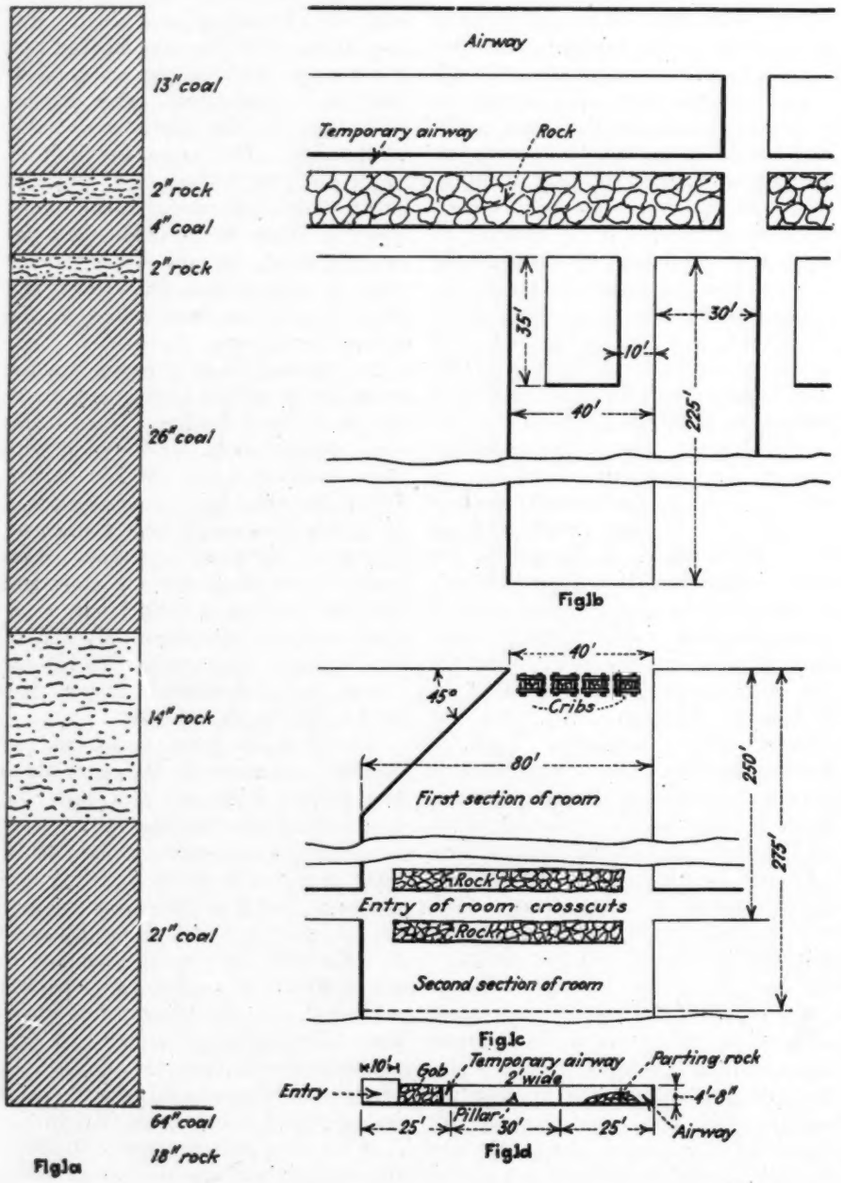
More coal could be produced at less cost if the preparation of faces could be eliminated at least in part. However, the loading machines could operate 80-ft. rooms for a distance of only 275 or 285 ft. To meet the situation, crosscuts on sights were driven between the rooms every 250 ft., which rooms were grouped in panels of twelve and planned 1,000 ft. long instead of 225 or 250 ft.

The rock in these crosscuts was shot so that they would serve as entries, and the material thus brushed was packed in the rooms which had already been driven 25 to 35 ft. beyond the line of crosscuts, just far enough in advance of the new entry for the setting of the deflectors and the beginning of new scraper-loading operations. The track in the old entry was transferred to the new one.

A scraper has a crew of four men: One scraper operative, one car trimmer and two face men. It is charged also with one shooter who drills and shoots the coal for the loader and one timberman who timbers the face before it is shot. The scrapers are worked on two 9-hour shifts in every 24 hrs. and load on each shift 100 to 110 tons. As much as 130 tons has been loaded with these six men.

It will be noted that nothing is said as to cutters and helpers, who are paid by the ton. They are omitted in the record of performance because they have to be employed both under the manual- and the mechanical-loading system of operation. The scoop will drag 1,500 lb. of coal from the face to the car, and three scoop loads fill on an average one 2-ton car.

Fig. 1a, Cross-section of Mary Lee Seam; Fig. 1b, Original, and Fig. 1c, Ultimate Method of Driving Rooms; Fig. 1d, Cross-section of Entry at Banner Mine



The biggest item in maintenance is rope renewal. This has averaged about 5c. per ton, including the ropes destroyed when training operatives. Trulay rope is now being used. With this and with the greater efficiency the operatives of the scrapers are attaining, it is said, a rope cost per ton of 3c. or less is anticipated.

At the Banner mine, another operation of the same company in the Mary Lee seam, gob headings are driven. The working height is about 56 in. The cross-section of a double entry with one entry low is as in Fig. 1d. The gob is used as a means of carrying the air from the last crosscut to the face, the ventilation passing up the roadway and back behind the gob to the last crosscut. At the Bradford mine a Myers-Whaley shovel is being used to load heading work in the low coal.

At many operations the mining of the Mary Lee bed presents a difficult problem because the "middleman" is so hard that it cannot be readily broken. At some mines, as has been stated, it is being drilled and shot and thus fractured, but it cannot be satisfactorily drilled without machinery. The use of mechanical drills, however, is becoming so common and is so advantageous in other ways that this consideration should not prevent the change in location of the drillholes being made if desirable. If, however, the coal under the "middleman" is undermined and shot and then shots are put in the coal above it, they have to be unusually heavy and are likely to be ineffective in breaking the "middleman." Moreover, the gases resulting from the explosion of the powder may seek relief in the coal, resulting in a blown-out shot or in the wrecking of the pillar.

This is why in some mines the practice has been to place shots in the "middleman" itself. The coal is shot below the "middleman" and sometimes is loaded out before that rock is shot. But sometimes a large proportion of the coal is left under the "middleman," so that when the latter is shot down it slumps over the fallen coal and can be slidden over into the gob with a pinch bar. Leaving the greater part of the coal in place makes the "middleman" fall far enough to be loose but not far enough to make it necessary to lift it up when it is gobbed; thus much effort is saved.

Unfortunately at some mines in the Mary Lee seam the pillars are badly shattered, the crevices going far into the heart of the rib. Some believe the

large quantity of powder used is the direct cause of the shattering and others that the "middleman" oxidizes and expands, pulling the pillars apart. That oxidation doubtless is aided by the heavy shooting which crevices the pillars and introduces air to the strata at points removed from the edge of the rib which with lighter shooting would not be exposed.

There are several means that might be adopted to protect the pillars against this harmful action: (1) The shooting could be done in the "middleman," (2) the coal under the "middleman" might be mined out with the help of conveyors so as to leave the "middleman" as a roof, thus making it easy to bring the rock down or enabling it to fall of itself; (3) the roadways could be driven, as at the Parrish mine, at a slight angle to the face or butt cleats so that there would be less danger of slabs sloughing off; (4) the coal rib above the "middleman" could be cut back beyond the line of rib left below that parting and thus there would be a berm of rock to support the edge of the upper rib.

The objection to the shooting of the "middleman" is in the cost of drilling it, and that is obviated by the use of mechanical drills. The advantage, on the other hand, consists in greater safety and more permanent pillars where the conditions are as have been detailed. The mining out of the coal with the "middleman" as top rock is declared by some who know the conditions well to be dangerous where there is moisture. It is said that the same oxidation that ruins the pillars causes the "middleman" to break and fall, even though props are provided to hold it up. That is one of the reasons in some mines why it is held to be undesirable to remove all the coal below the "middleman" before it is shot down.

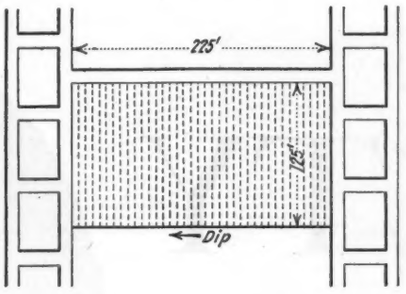


Fig. 2—Longwall Work in Black Creek Seam

The action of the "boy" rock is quite different from that of the "middleman." Where it is 6 in. thick it makes a good roof unless gas in the upper seams brings it down.

Another application of machinery has been made at a mine owned by a company operating the Black Creek seam. Here a roadway 225 ft. long, high enough to accommodate loaded cars, was driven between pairs of entries, and coal was sliced back from one of the entries on a 125-ft. face with a Goodman undercutter, the coal being loaded by hand into a 24-in. Eickhoff shaking conveyor. The coal ranged from 30 in. to 17 in. The work was quite successful but, unfortunately, no section of the mine seemed likely to give equal satisfaction, for only rarely did the coal thickness remain so consistent over a large area. So the equipment was taken out. This mine, it would seem, would find it profitable to establish a method of removing the coal with undercutting, shooting and suction. The coal could be shot out of the solid wherever it is too thin to cut. This system of removing the coal by suction has been established near Durham, England.

The Coal That Underwrote Birmingham's Industrial Activity

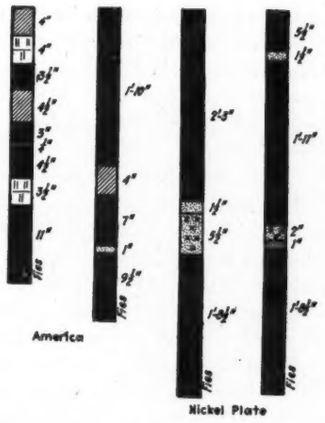
(Continued from page 589)

working height (which includes the "middleman" and his one, two, or three, more or less, husky "boys"). Thus the working thickness may be 9 ft. 3 in. and the coal thickness only 6 ft. 8 in. Some Mary Lee cross-sections are shown on page 589.

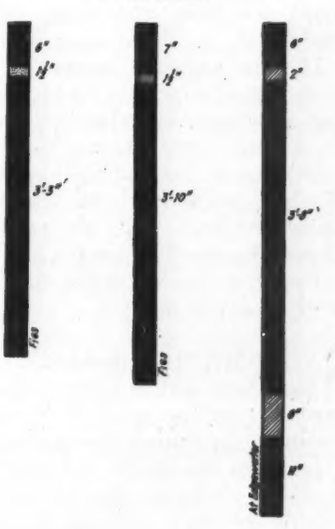
On the left of that page in a chart taken from the State Geological Survey the America seam is shown as different from the Nickel Plate and a few feet below it. That is not the commonly accepted view today. The two names appear to denominate the same seam as uncovered in different districts. It is not a clean seam, but where the faulting is considerable a mine which starts out to work the Pratt will find itself occasionally in the America. For faults will elevate the America to the level of the higher seam, leaving little alternative but to mine the America seam while finding some way to go up and hunt the Pratt bed. The America bed where it is known as Nickel Plate usually has fewer partings than where it is known as the America.

The Pratt bed is the most highly regarded of all the beds, though it has a 1½-in. parting about 6 in. from the roof. It is believed by the Geological Survey of Alabama to be the same as the Gholson bed in the Cahaba Field. At Marvel this latter seam is 3½ ft. thick. The Pratt has a working thickness of 3 ft. 10½ in. to 4 ft. 6½ in. It may be that the Mammoth, or Thompson, seam which at Marvel is 5 ft. thick and said to be 300 ft. above the Gholson bed, is the correct representative of the Pratt bed in the Cahaba field. Most of the older mines of the Warrior field are in this Pratt bed.

America-Nickel Plate Seam

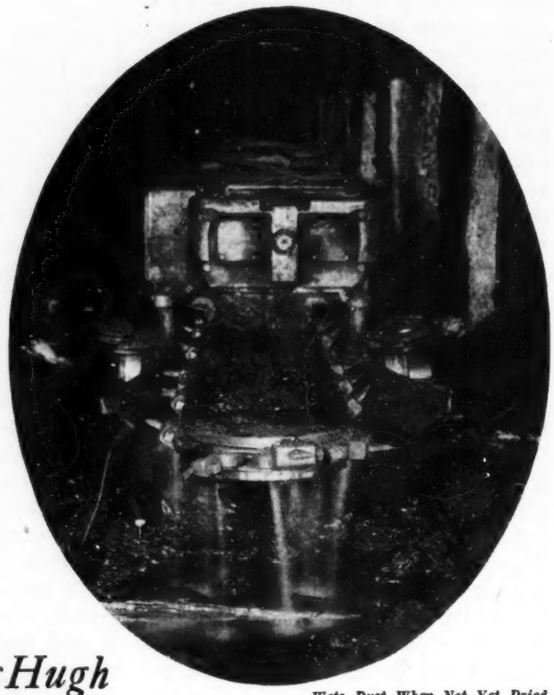


Pratt Seam



SAFETY

Made a Study By T. C. I.



Wets Dust When Not Yet Dried and Water Shy

By J. M. McHugh
General Superintendent, Coal Mines
Tennessee Coal, Iron & Railroad Co.,
Birmingham, Ala.
and
Ed. Flynn
Chief Inspector, Coal Mines
Tennessee Coal, Iron & Railroad Co.,
Pratt City, Ala.

◆

SAFETY is an all-important feature at the operations of the Tennessee Coal, Iron & Railroad Co. The mines are as completely organized to that end as they are toward production. The management gives safety major consideration and, as a result, unusual precautions have been devised and adopted. Other means of safety, the values of which are well established, are not only ordered but demanded as an essential condition of employment. The company officials are continually studying the means by which greater safety can be attained.

A safety department for the coal mines of this company was established on April 1, 1910. A chief mine inspector was employed to inspect all working places, machinery and other equipment in and around the mines and make recommendations to safeguard the lives and limbs of the employees.

The six principal causes of accidents in coal mines are : (1) Falls of roof and coal; (2) explosions of gas; (3) explosions of fine coal dust; (4) explosions of gas and fine coal dust; (5) haulage, and (6) electrocutions. These hazards and the methods adopted by the Tennessee Coal, Iron & Railroad Co. to combat them will be discussed in turn:

SYSTEMATIC timbering rules have been put in force. Timbers must be set in rows 4 ft. apart, lengthwise and crosswise in all places, 2 ft. from the track and not more than 4 ft. from the face of the coal. Where the roof conditions are unusual, the working places are timbered according to instructions of the foreman in charge of the mine. Miners are required to pull or blast down all hanging top coal and are disciplined if found working under dangerous conditions. In some of the mines where it is necessary to employ inexperienced men, head miners are employed to blast the coal, timber the working places and lay room tracks. The new men are permitted only to load coal.

Ample means of ventilation are provided to dilute, render harmless and carry off all noxious, poisonous and explosive gases. The split system of ventilation is used; all overcasts are of concrete construction; stoppings are built of rock and plastered with clay and cement; line brattices are erected in all tight places to conduct the air current to the face, where it is necessary to erect ventilating doors they are built to close automatically and emergency doors usually are provided so that in case a door is torn down the emergency door can be closed, preventing any interruption in the flow of air.

All ventilating fans are provided with auxiliary drives with two sources of power, so that if one source fails, the other can be used without stopping the fan. Firebosses are employed to examine all working places for gas or other dangerous conditions before the beginning of the shift and must be at some convenient place when the men enter the mine to notify each miner as to the condition of his place. Where mines are worked on double shift all working places are examined by the fireboss between the time one shift ceases to work and the other shift starts. All abandoned workings are ventilated and are examined semi-monthly by firebosses.

TO ELIMINATE the hazard from fine coal dust, rock-dusting and watering systems are being used. All main haulage roads are rock-dusted, and the room headings and rooms are drenched with water hose. the pressure being from 40 to 50 lb. per square inch. All coal-cutting machines are equipped with a watering device, and water is played on the machine cuttings from the end of the cutter bar. If this device is not working, the machine is considered as out of order and the operative is subject to discharge if found running his machine.

Rock-dust samples are taken at short intervals and analyses made. If the rock-dust content is below 65 per cent, another coat of dust is applied. The room headings and rooms are

drenched by sprinklers as often as necessary to keep roof, sides, floors and gobs wet, thus preventing the fine coal dust from flying.

The precautions that are being taken to eliminate hazards (2) and (3) naturally take care of danger under subject (4).

All accidents that happen while handling or transporting cars are charged to haulage. There are four systems of transportation in the coal mines of the Tennessee Coal, Iron & Railroad Co., namely: slope cables, endless rope, electric locomotive and belt conveyor. All cable ropes are inspected regularly by the master mechanic to see that they are in proper condition. All electric locomotives are of the double-end control type, and motormen are required to operate them from the rear end.

LOCOMOTIVES are provided with a warning device which the motorman must sound when rounding curves, approaching doors or where men are working or traveling along the haulage roads. The tracks are kept in good condition, and track cleaners are employed to keep the haulage roads clean and free from accumulations of timber or other rubbish. Shelter holes are provided along the main haulage for men to enter when trips are passing.

At the exit of all pumprooms, generator rooms, underground hoisting engine rooms and at the underground dumps where men are likely to step out in front of moving trips, guard rails are installed, so that the men will have to turn either to the right or to the left to get onto the tracks and cannot step directly into danger. No one other than trip riders is permitted to ride on trips of cars, except on the man-trips that are provided for hauling men to and from their working places. Coupling cars while they are in motion and making flying switches are strictly prohibited.

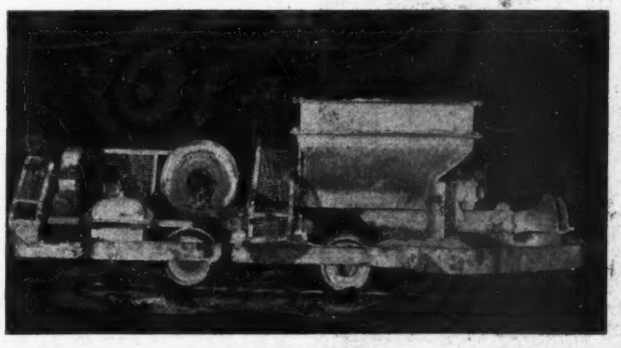
The following precautions are taken to prevent electrocutions: Trolley wire is shielded on main haulage roads where it is less than 6 ft. 2 in. from the top of rail, also at curves and doors and at all points where men have to pass under it. The trolley wire in cross headings is strung on the opposite side from the openings to rooms and is shielded on either side of the wire with 1x5-in. boards, which are bolted to U-irons supported with roof bolts. Coal-cutting machines and electric coal drills are equipped with two ground wires; the second wire is fastened to the frame of the machine and connected to the water line which furnishes water to the mining machine while undercutting coal. All switchboards are safely grounded. All gears, belts, sprocket wheels and chains are provided with safety guards. This applies to machinery both underground and on the surface.

Guard at Door Keeps Men From Stepping Out on Endless-Rope Road

THE mines are divided into sections and foremen appointed to each of these. Their duty is to see that compliance is made with all the safety rules, and especially with those relating to systematic timbering. A permanent safety committee is appointed at each mine to investigate all serious and fatal accidents and to make the necessary suggestions to prevent similar occurrences.

A safety meeting is held once each month in the office of the superintendent of each division, and all foremen are required to attend these meetings. All lost-time accidents are closely scrutinized and discussed with the purpose of ascertaining who should be blamed for them and what can be done to prevent the occurence of similar accidents in the future.

In addition to these meetings, a general superintendent's meeting is held on the last Thursday of each month, when safety is the principal subject discussed. The coal mining safety department takes the position that accidents do not just happen but that there is a cause for all of them. Diligent effort is made to discover this cause with the purpose of remedying it if possible.



Twice Monthly in the Summer This Rock-Dust Distributor Makes Its Rounds

Achieves Stabilization

(*Continued from page 593*)

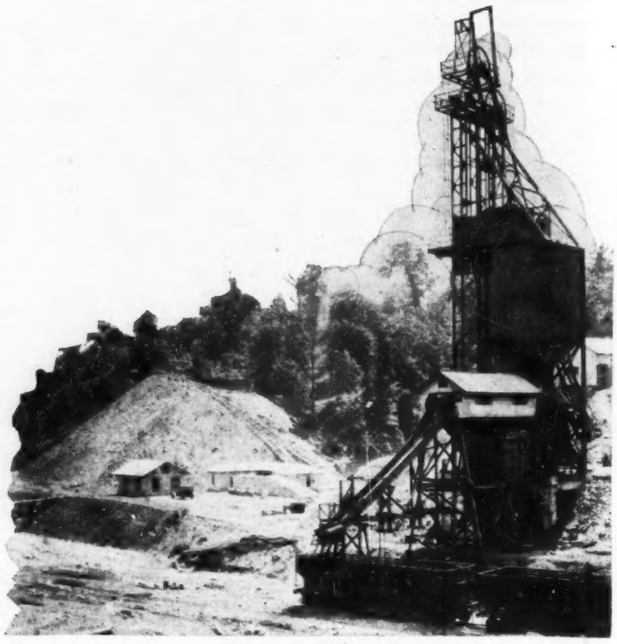
time this particular company is running a campaign in nearly 300 publications of this type with favorable reactions from both consumers and retail dealers.

This same company also has developed an elaborate series of dealer helps, including suggested letters to domestic consumers; dealer copy, mats and plates for local advertising over the dealer's own name; telephone solicitation instructions and talks; and special seasonal trade-building plans. "Snowbird" competition is present in the South as well as in the North, and this company has helped its retail distributors block such selling by copy showing them how they can apply the "club-purchase" plan to hold business which otherwise would go to the mail-order shipper.

By adopting a consistent price policy and making a real attempt to work with the dealer, operators pushing domestic coal have made the retail franchise mean something to the distributor. In refusing to allow a passion for increased tonnage unseat judgment, the Alabama coal industry as a whole has achieved a stabilization which its competitors well might emulate.

Skip Hoisting and Drop-Bottom Cars

Adopted at Aldridge



Headframe and Hoist House, Aldridge Mine

NEAR America Junction, in Walker County, Ala., the Stith Coal Co. has opened a shaft mine—the Aldridge—which will be one of the large producers of the state. Drop-bottom mine cars are used and the hoisting is by skips.

The new shaft, into the Mary Lee seam, is but a few hundred feet from the old tipple and washer which have been used for years to handle the coal from three drift mines in the America seam. Two of these mines have been shut down since last December. The old washer is being used temporarily for the new mine and it also handles the 500-ton output of the one drift mine, but it is to be replaced soon by a modern plant.

Dimensions of the shaft are 11 ft. 4 in. x 24 ft. 4 in., and the depth is 414 ft. A section 11 ft. 4 in. x 7 ft. 4 in. is used for electric wires and pipe lines. Hoisting of coal began in May, 1927. The present production is 600 tons but the plans now under consideration call for an ultimate output of 2,500 tons per day at this mine.

Overturning skips of 5½ tons capacity are used. The shaft bottom is equipped for automatic loading of the skips and automatic signaling to the hoistman. The undercut gates which load the skips are operated by hydraulic cylinders. Control of the valves is by electro-magnets and timing relays energized through contacts operated directly by the descending skips.

The hoist is powered by a 400-hp. slip-ring induction motor with contactor and grid resistance control. The drum diameter is 10 ft. except for the first three of four rope grooves, where the diameter steps from 7 ft. up to 10 ft. Protection against overspeed, over-travel, and so on is provided by a Lilly control.

Energy for operating the plant, including the old mine, is purchased from the Alabama Power Co. At a production of 14,000 tons per month the 15-minute demand is about 550 kw. and the energy consumed is 7.14 kw.-hr. per ton. Direct current is supplied by an outside substation containing one 15-kw. induction motor generator and one 200-kw. synchronous unit, both with manual control.

Cutting Machine With Hose to Cutter Bar

The manway into the new mine is a 7x16-ft. slope 833 ft. long on a 28-deg. pitch. It is located near the shaft and is equipped with a track and electric hoist.

Sixty-five inches is about the average height of the seam. It is divided by a 7-in. "middleman" of limestone formation which tends to slack when exposed to air and moisture. The coal above the parting has a fairly uniform thickness of 39 in. but the lower bench varies from 7 to 31 in. The top is a strong slate which holds while the rooms are being driven, but scales badly in the entries.

Rooms are worked 40 ft. wide on 70-ft. centers. It has not been decided when to rob pillars. Butt entries are turned on 600-ft. centers and every tenth room is a barrier. Triple entries are driven for main headings and double entries for room headings.

Three shortwall mining

(Turn to page 608)

WOODWARD

FIGHTS EXPLOSION HAZARD

With Rock Dust and Water

By D. J. Carroll

Superintendent, Mining and Engineering
Woodward Iron Co.
Woodward, Ala.

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THE explosibility of coal dust in the mines working the Pratt seam in Alabama has for many years been recognized as probably the greatest hazard to be encountered in mining this coal. Explosions have not only been propagated through the mine workings after having been started by gas but the coal dust has ignited without the presence of methane and caused the loss of a great many lives.

Recognizing this danger, the Woodward Iron Co. for several years has taken special precautions to prevent the accumulation of dust in the mines by using water on the cutter bars of all mining machines and sprinkling in all working places and along all haulage roads. Humidifiers are operated in the intake airways and loaded mine cars are sprinkled at several points while en route from the face to the surface. Rock-dusting to take the place of the sprinkling in rooms and on haulageways was not adopted by the Woodward Iron Co. until about a year ago.

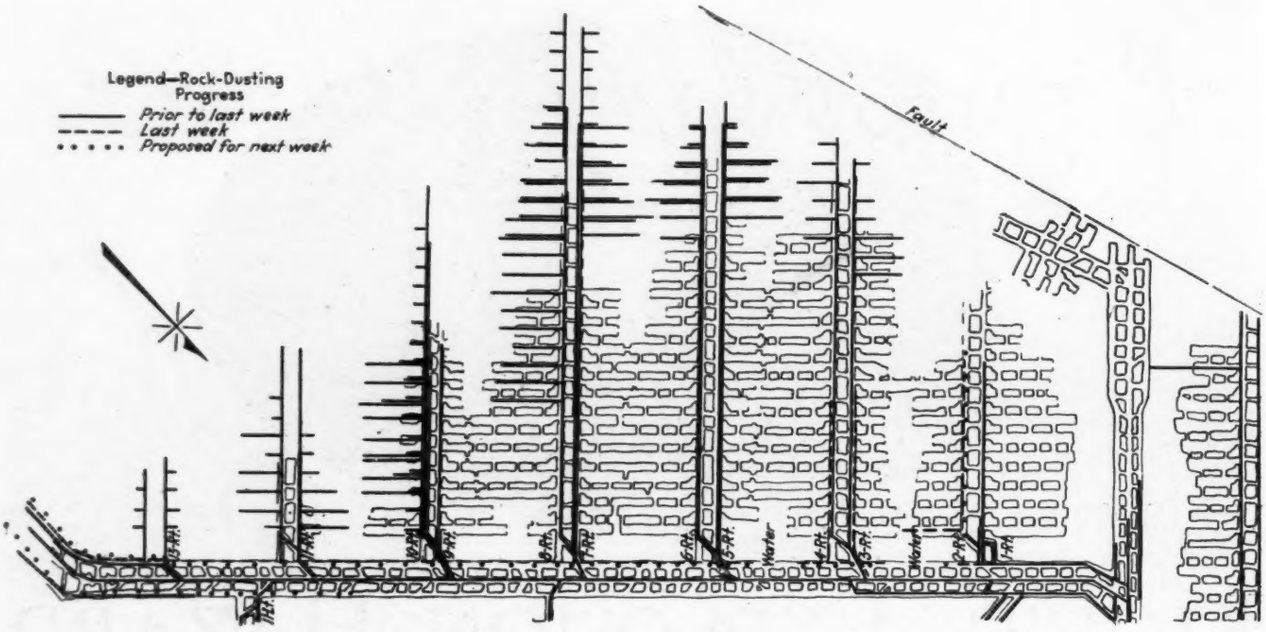
The fact that many mines throughout the country were using rock dust and that in some instances where they were supposed to be protected, explosions of gas were propagated throughout the mine workings caused the management of the company to hesitate in changing from the sprinkling of the working places and haulage roads to rock-dusting. Investigation of the rock-dusting methods used by other companies revealed that most of these mines were dusting in the haulageways, where it was easy to operate the dusting machine, and that in many cases no attention was given to dusting of the working places, aircourses without track for the operation of the dusting machine or worked-out areas of the mine that might be standing open.

Explosions spreading through a mine seem to have little tendency to confine their travel to entries suitable for the operation of the rock-dusting machine and will change their course to go through haulageways, aircourses or old sections of the mine, if necessary, and pick up coal dust to feed themselves. Realizing this, it was decided that if rock-dusting at the Woodward company's two mines was to be an improvement over the old method of sprinkling, it must take care, as near as possible, of not only the haulageways but also of the aircourses and the worked-out places. Both mines are old and contain large sections that have been worked out. These sections are standing open and are being ventilated. The task of rock-dusting under these conditions is much greater than in newer mines.

The methods now employed in protecting these mines include the use of power-driven rock-dusting machines on all haulage roads, dusting both the haulage entry and aircourse in new sections of the mine before the track is removed from the aircourse. Aircourses paralleling the main haulage entries where track has been removed are rock-dusted by hand for distances of at least 300 ft. in each direction from points where cross entries have been turned off.

Worked-out areas of the mines have been divided into sections and all entries entering these sections are being dusted for a distance of from 300 to 500 ft. from the mouth of such entries to stop any possibility of an explosion traveling either in or out of this worked-out section. The use of rock-dust barriers was seriously considered for places of this kind and finally abandoned for the above method, due to difficulty of maintaining barriers in working condition in these sections.

Both the haulage entry and the aircourse in working panels are dusted to within 100 ft. of the face and sprinkling is carried on from the end



Entry and Room Development Showing Progress of Rock-Dusting; Past, Present and Proposed Work Is Shown Each Week by Appropriate Markings

of the rock-dusted section to the face. Rock-dusting by hand is carried to within 100 ft. of the face in all working rooms and sprinkling done from this point up to the face.

The use of water on the cutter bars of all mining machines is continued and the rule covering the use of water by the machine men is rigidly enforced. The company also continues the practice of sprinkling all loaded trips en route from the face to the surface as well as continuing the use of humidifiers in the intake airways.

Sampling of dust in the mines is carried on by one of the safety inspectors and reports are made weekly covering different sections of the mines. Sections where the incombustible content falls below 70 per cent are scheduled for redusting within the following week. In the period from July 7 to Sept. 11, 1928, inclusive, 102,030 ft. of entry and 21,150 ft. of rooms were dusted. Weekly reports made show that the above figures represented entries and rooms redusted as well as new work.

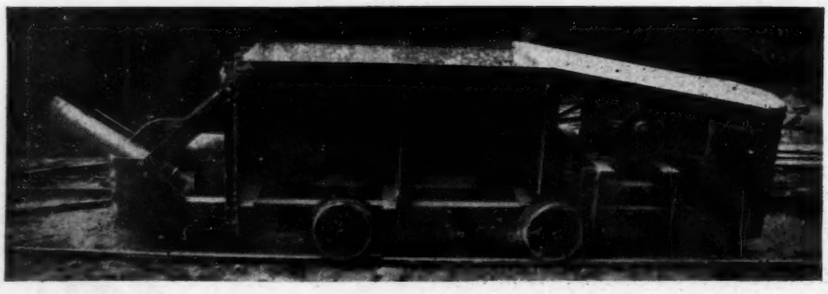
Check on progress made and plans for further work are recorded weekly on mine maps in the office of the chief executive of the company. These maps show: (1) Rock-dusting progress prior to the week preceding the latest entry of work done; (2) rock-dusting progress for that week, and (3) the sections of the mine selected for treatment the following week. A section of one of these maps is reproduced herewith.

Distributor Does Not Choke in Its Dust

FIRST in the Southern district to complete rock-dusting was the No. 11 mine of the Galloway Coal Co., at Carbon Hill, Ala., a distributor being used which was developed by the Galloway Coal Co. for that purpose. It consists primarily of a one-ton hopper bin, a 12-in. Jeffrey blower, a 5-hp. motor, a 4-in. screw feed with a combined planetary-gear reduction and clutch control. It was built when there were few if any satisfactory distributors on the market and was a success from the first. It has been in use for over four years and only the motor has had to be repaired.

The success of the distributor is principally due to the absence of exposed gears and to the clutch control, which allows a variable quantity of dust to be delivered to the air-blast tube at the will of the operative. The tube does not become clogged because the blower can be brought to full speed before the dust is delivered to the air-blast and the tube can be cleared out before the current is turned off the blower.

Distributor Clears Its Windpipe by Deep Breathing Before and After Discharge

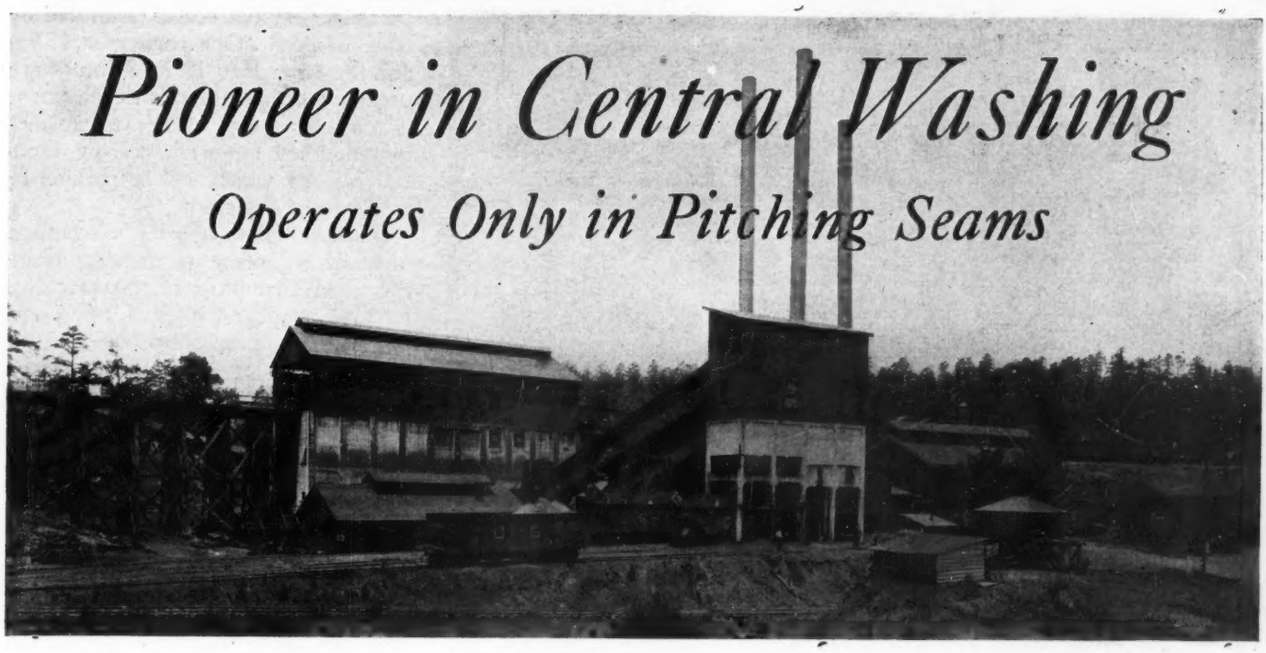


Has Forty Workable Seams

S. W. Farnham, mining engineer, Goodman Mfg. Co., corrects the statement attributed to him on page 528 of the September issue of *Coal Age* that in the Donetz basin of Russia there were "40 seams but only seven or eight of these were thick enough to work." What he actually said in substance was that only seven or eight of these seams usually were workable in any one locality. He adds that all the 40 seams are workable but, due to the depth of seam, to faulting or to erosion, not all of them are found to be minable at any one place.

Pioneer in Central Washing

Operates Only in Pitching Seams



Colgate Washer and Power Plant, Alabama Fuel & Iron Co.

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ONE of the large Alabama producers is the Alabama Fuel & Iron Co., which, contrary to its name, limits its activity to the production and sale of coal. The combined output of the eleven mines now active is 4,875 tons per day. Seventy-five per cent of the tonnage is sold for locomotives and ships owned by railroad companies, 15 per cent for steam plants and 10 per cent for domestic trade.

Thirty-five hundred tons is handled at the central cleaning plant, known as the Colgate washer, which is so located that the output of all but two of the mines is "washed in transit." Adjacent to the washer is a power station from which all of the mines are served.

Because the washer is of unusually substantial construction and is well maintained it is difficult to realize that it has been in use seventeen years. There is nothing about the structure or equipment except a date, "July, 1911," to indicate its age. The main structures are of reinforced concrete and the roof sections are built of steel.

THE washer is a gravity arrangement except that the product must be elevated to the railroad-car loading bins. Car shifting also is done by gravity. After leaving the dump house at the top of the washer the empties return on a gravity switchback to the loading bins. The storage for loads holds 80 cars. Dump bins at the top of the washer have a capacity of 800 tons.

All of the washing at Colgate is done by Elmore jigs equipped with floats to automatically regulate the speed of the rotating state discharge valves. Approximately 8 per cent of the tonnage received is discarded. This refuse, amounting to 280 tons per day, is carried to the dump by an 18-in. belt conveyor that is over a quarter of a mile long.

The washer is divided into two divisions, one for each dump track. On the side which handles the coal from the Acmar mines, sizes ranging from 6 in. to dust and 5 in. to dust are washed. The under 2-in. is separated from the rest. It is washed separately and then is mixed for shipment.

COAL lost on this side of the washer runs 4 per cent of the refuse, as determined by float and sink at 1.45 gravity. The loss formerly ran 37.1 per cent coal under $\frac{1}{8}$ in., but the practice has been improved to 26.2 per cent.

Colgate is 17 miles from the farthest mine. The central power plant serves this mine, but the washer serves only those mines which are within $6\frac{1}{2}$ miles. At the Overton mines there is another washer. There both tables and jigs are used.

Fuel for the central power plant, consisting of 6-in.-and-down washed coal, is delivered from the washer to the bunkers by a short conveyor. In the boiler house are four 300-hp and two 200-hp. water tube boilers operating at 200 lb. pressure and equipped with underfeed stokers. The natural draft induced by steel stacks is augmented by force fans.

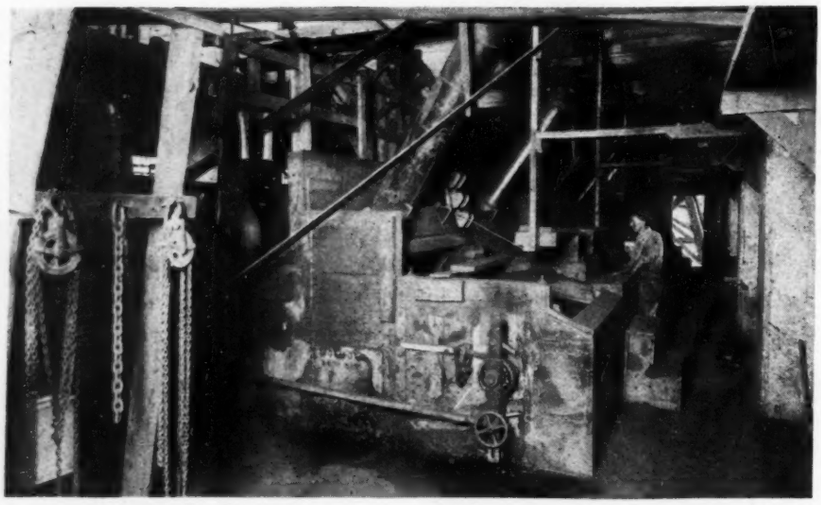
Generating capacity totaling 3,750 kw. consists of the following turbo units: one 1,500-kw., one 1,250-kw. and two 500-kw. The day load of 2,900 kw. is normally carried by the two large units and the night load by one of the small units. The condensers are of the barometric type.

POWER is generated at 2,300 volts and is transmitted to a mine 2 miles away at this voltage, but pressures of 13,500 and 33,000 volts, respectively, are used for transmission to other mines 7 miles and 17 miles distant. Creosoted wood poles with steel crossarms is the standard line construction.

At Colgate there also is a central shop where electrical winding is done for all mines. This plan of having the central shop, central power plant and central washer together simplifies the supervision.

All eleven of the active mines are slope operations in pitching seams where the longest life of an opening is about 15 years. Because of this short life, wood tipples are used exclusively. The mines are gassy and electric cap lamps are used in all of them. The lamp equipment consists of 1,225 lamps, of which 875 are the lead battery type. Both types are not used at any one mine.

Main haulage is gravity hoisting. Three of the hoists are steam operated and the others electric. Only



Elmore Jigs With Automatic Slate Gate Control

four gathering locomotives are used. Mining machines are in use only at Overton No. 1 and at the New Acton mines. At other mines the coal is shot from the solid with permissible explosive.

SHOTFIRERS are employed at all mines. Electric blasting is the method of firing during the day but fuses are used for the night shooting.

Water is used on the cutter bars of the few mining machines employed, and sprinkling lines are installed in rooms for the loaders to wet down their places.

All haulways and room entries are rock-dusted and likewise the aircourses where there is track. Trough barriers are placed in the main aircourses.

Ventilation is by the split system and only a few mine doors are used. No brushing is allowed in clearing places of gas. Wing brattices or curtains must be used. All fans are equipped with graphic recording pressure gages, but there is no provision for auxiliary power because of the limited use of electricity inside of the mines and the fact that in most operations the working places are not a great distance from the portal.

New Acton No. 3 mine, located 1½ miles from Colgate, produces a domestic coal which commands a top price. Last winter the lump sold for $5 per ton at the mine and this year the output for the remainder of 1928 had been sold by July 1. This selling was built up around a direct-mail campaign to the trade.

THIS lump coal, from the Helena seam, is said to run as low as 3½ per cent ash and as high as 15,000 B.t.u. Beginning at the outcrop where the main slope enters the seam lies on a pitch of 18 deg. At a point 900 ft. down the pitch from the surface the seam turns upward and is practically vertical to another outcrop.

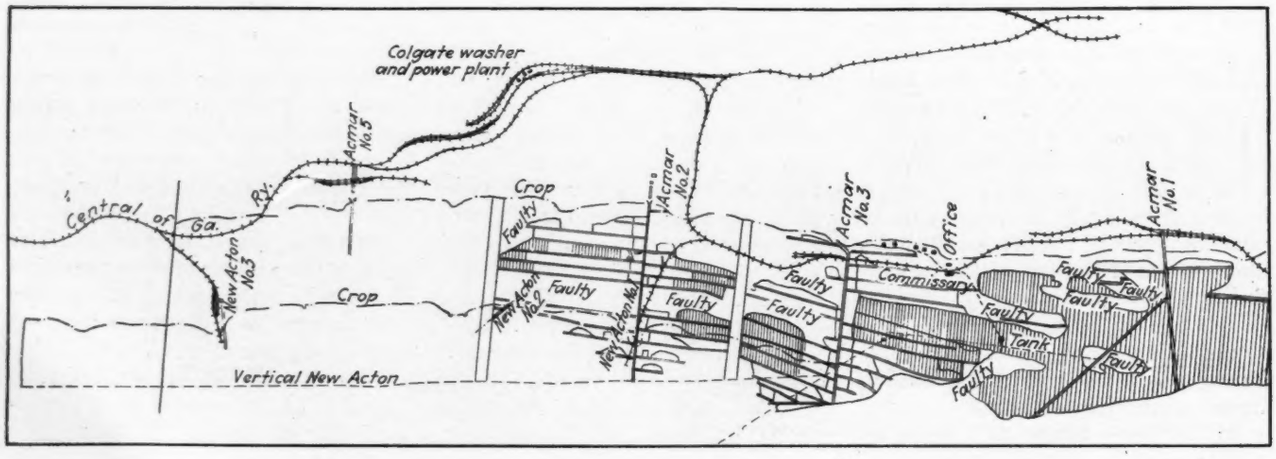
This vertical portion is workable for only 50 to 75 ft. from the bottom. Above this the coal "pinches out." The seam is 7 ft. thick and has two partings near the center separated by 6 in. of coal. One parting is 15 in. and the other 8 to 10 in. Chutes are used in working the pitch coal, but it is the intention to change to advancing modified longwall, driving faces 200 ft. long which will be parallel to the pitch of the seam.

Another mine, a brief description of which will serve to further indicate the general conditions, is Acmar No. 5. The slope portal and tipple are but half a mile from the central washer. Mining is in the Mammoth or Henry Ellen seam, here running 10 to 12 ft. in thickness and lying on a pitch of 30 deg. A section of the vein is as follows: 8 in. of top coal, 6 in. of slate, 5 ft. of coal, 18 in. of rash and 5½ ft. of coal.

THE mine is five years old and the main slope is now 2,000 ft. long. The operation was developed for a production of 1,000 tons per day but is now being operated at 650 tons. At this mine the hoisting is done by steam which is generated in two 250-hp. hand-fired boilers of the Stirling type.

The locations of the mines of this company are not shown in the general geological map which appears at the bottom of page 588 in this issue. The Irondale mine is northwest of Birmingham, and like that city, is located in Jefferson County. The New Acton, Margaret and Acmar properties are located in St. Clair County, near the northern extremity of the Cahaba field and beyond the confines of the map.

Taken collectively, mines of the Alabama Fuel & Iron Co. form a group in which few ideal natural conditions can be found. The officials have, however, done a real job in systematizing methods and promoting safety. Charles F. DeBardeleben is president of the company, and F. R. Bell, manager of mines.



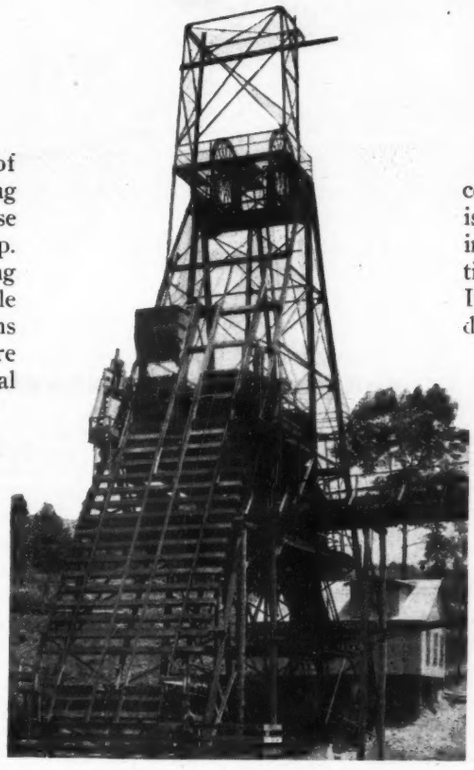
Colgate Washer and Mines of Acmar Division

Score Another Victory for MECHANIZED MINING

EVEN in the thicker seams of Alabama mechanical loading has made slow progress because of the thick partings and weak top. However, an operation is now being developed by the New Connellsville Coal & Coke Co., in which conditions are so different that arrangements are under way to make it a mechanical mine.

The seam, known as the Blue Creek, is 74 to 79 in. thick, contains but two thin partings and has excellent top and bottom. It is a high-grade coking coal running about 20 per cent volatile, 70 per cent fixed carbon, 10 per cent ash and 0.6 per cent sulphur. The partings consist of a 1-in. shale rock located 27 in. from the bottom and 2½ in. of the same material 30 in. from the top. The ash content can be reduced by washing.

The mine is the property of the New Connellsville Coal & Coke Co., which is owned and operated by the same interests that own the Yolande Coal & Coke Co. It is situated on a branch of the Louisville & Nashville R.R. about four miles from Yolande, in Tuscaloosa County.



Permanent Steel Headframe but Temporary Skips

Although the mine has been spoken of as "new," in a sense it is quite old. The first opening was made 40 years ago. Twenty years ago it was opened again but it was idle for seventeen years prior to the present activity.

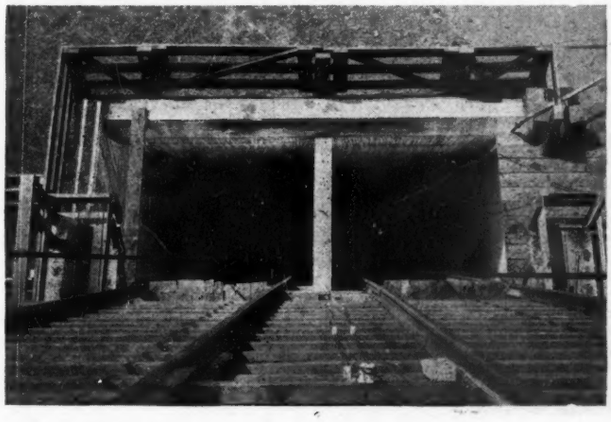
The explanation of such excellent coal being left unmined all these years is that the early mining was done only in a portion of the seam which is tipped to 67 deg. from the horizontal. It was mined from the outcrop to a depth of 650 ft., where a thrust fault was encountered. Core drilling in recent years to depths of 800 to 900 ft. located the seam on the other side of the fault and indicated the pitch to be only 17 deg.

It is to mine a large acreage on that side of the fault that the new mine is being developed. The old slope through the coal was rehabilitated with concrete and new timbering, and was extended 218 ft. through rock to the coal below.

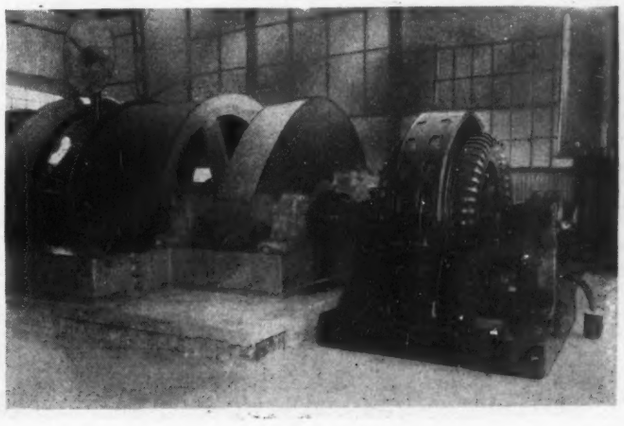
A steel headframe and a 700-hp. electric hoist have been installed and are being used to complete the construction work in the slope. Work is about completed on the automatic skip loading pocket at the bottom of the 900-ft. slope. The skips will carry 7½ tons each. Twenty-five hundred tons per day is the rated capacity of the new equipment.

Before work was started on the skip loading pocket the main entry

Looking Into the 900-Ft. Slope



The Hoist Is Driven by a 700-Hp. Motor

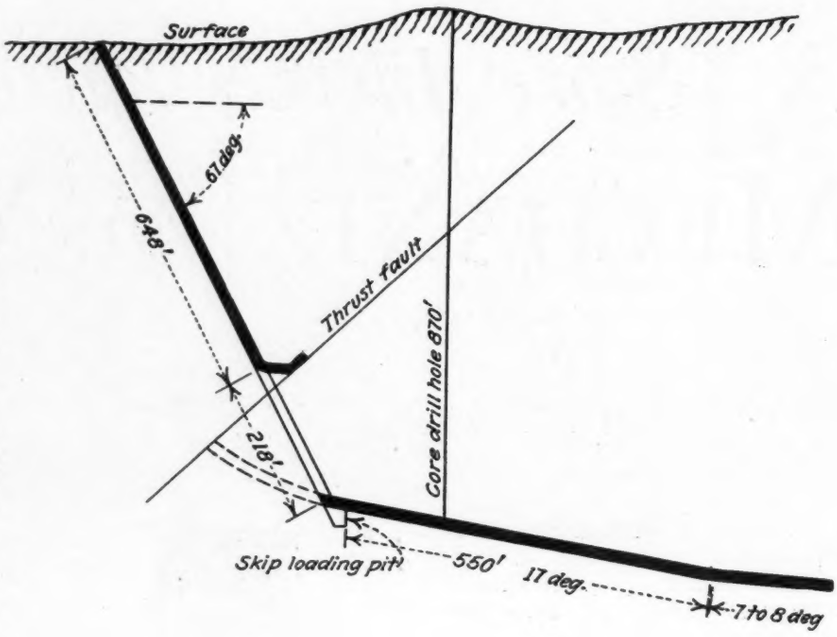


was driven several hundred feet in the coal. About 550 ft. from the slope bottom the seam flattens to 7 or 8 deg. Belt conveyors will be installed on the main entry to bring the coal to the skip loading station.

The main hoist, which operates the skips in balance, has two cylindrical drums 5 ft. wide and 10 ft. in diameter. It is equipped with an oil-operated brake and with Lilly control. The 700-hp. motor is of the slip-ring induction type and is built for 505 r.p.m. Its control is by the grid resistance and contactor method.

About 1,500 ft. from the main slope a manway is being driven on the same pitch. The 600 ft. through the coal has been completed and the work is now in the rock.

It will be a year or two before the mine is on an operating basis. J. B. McClary, of Birmingham, is president and manager of the company, and Edmund Ewing, of Yolande, is superintendent and chief engineer.



Cross-Section Through Connellsville Slope

Skip Hoisting and Drop Bottom Cars Adopted at Aldridge

(Continued from page 602)

machines and three cable-reel locomotives make up the present cutting and hauling equipment. One machine is a "low-vein" and the other a "universal." Two of the locomotives are 6-ton and the other is an 8-ton.

Where the seam is above 5 ft. in thickness the two benches are shot separately. Holes just below the "middleman" are fired first, and as much of the bottom coal loaded as can be reached with a hand shovel without getting under the overhang. Over half of the "middleman" comes down with the bottom coal. Shotfirers shoot the bottom holes, but the miners do their own shooting in the top coal.

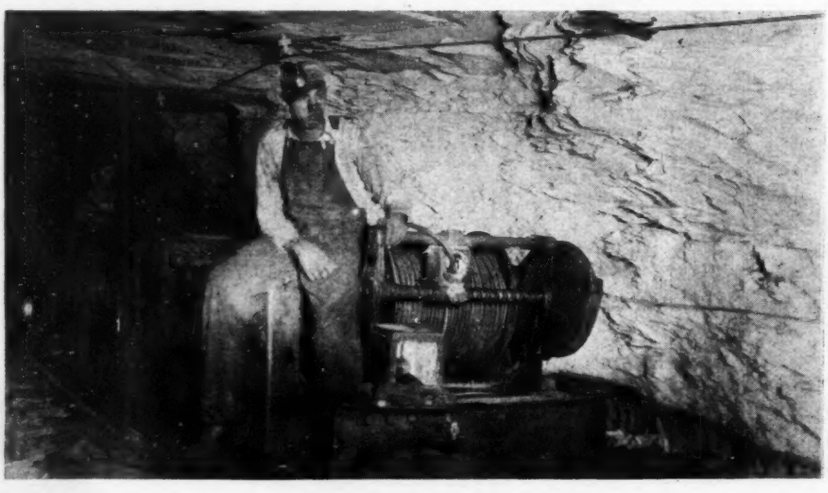
Where the seam is 5 ft. or under, in which case it is the bottom coal only that is thinner, the whole face is shot down at once.

Permissible "Red H6" is used in the top holes and permissible "Red HF" under the parting. Fuse is used, and the firing is done during the day. Tamping consists of two dummies of rock dust placed next to the explosive and one of clay.

Cuttings are cleaned from the undercut and loaded before shooting.

* * *

Locomotive in Rock-Dusted Entry, Aldridge Mine



According to James House, superintendent, "this reduces the powder one-third, increases the lump slightly, and causes less breakage of the 'middleman'."

Precautions against scattering of coal dust consists of using water on cutter bars and sprinkling bottoms of entries. The supply is obtained from a diamond-drill prospect hole which was cut into when taking the coal and was found to be making considerable water. It delivers water at an average pressure of 75 lb. Rock dust is applied to the roof and ribs of entries with a power-driven machine.

The 600 tons now being produced by the mine is handled with 40 Sanford-Day drop-bottom cars of 5,500 lb. capacity. At present the coal dumps from the cars directly into a 250-ton concrete bin located at the shaft bottom. Later the coal will be dumped at a point about 30 ft. from the bin and be conveyed thereto by a 48-in. belt. This conveyor, not yet installed, will serve as a picking table.

In addition to the storage of 250 tons on the bottom, there is a 350-ton bin at the top. This is a round steel tank into which the skips dump.

A. B. Aldridge, of Birmingham, is general manager of the company, and J. T. Foreman, who lives at the mine, is assistant manager.

MANAGEMENT
Triumphs Over Adverse Mining Conditions

MINING conditions not particularly favorable are found at Summit mine of the Alta Coal Co. and at Powhatan mines No. 1 and No. 2 of the Franklin Coal Mining Co., yet these mines are seldom closed because of lack of market. Conservative methods, careful preparation and control by a common selling agency, the National Coal & Coke Co., of which R. T. Daniel, of Birmingham, is president, are some of the reasons.

The Powhatan mines are in Jefferson County, about 29 miles from Birmingham. Both operate in the Mary Lee seam, but only the upper bench of coal is worked. Over most of the territory a 16-ft. interval separates the upper and lower benches, but at the face of the slope in No. 1 mine the two benches are but 20 in. apart. Here the upper has retained its thickness of somewhat over 4 ft. and the lower is 30 in. thick. In both mines a tender roof makes it necessary that timbering be done in a systematic manner.

The main haulway of No. 1 mine is a slope on a 3½ per cent grade. A single rope hoist powered by a 230-hp. direct-current motor pulls the trips a distance of 4,100 ft. to the outside.

Haulage equipment consists of one 13-ton trolley locomotive and three 6-ton cable reel locomotives. Four "universal" shortwall machines do the undercutting.

The production of 900 to 1,100 tons per day comes from 40-ft. rooms driven 250 ft. deep on 70-ft. centers. The room entries or levels are continued to the property line. Tracks are laid along each rib in rooms and the remaining space is timbered with props on 4-ft. centers each way. Although the mine was opened in 1918, no pillars have been removed because of the fear of water. They will be recovered on the retreat.

In the day time open lights are used except in certain places, but at night closed lights are used. Water is not applied to the mining-machine cutter bars but in each working place there is a pipe line connection and 50 ft. of hose with which the places are washed down after cutting or before loading. A regular spray crew is kept busy spraying entries and the gob. When pipes are removed from working places these areas are given a thorough rock-dusting.

At the face of the main slope there was completed last February a 500-ft. 30-deg. slope to serve as an intake airway and escapeway. In May a full-automatic substation containing a 200-kw. motor-generator set was installed at the portal of this slope.

There is a power plant at the mine but it is shut down in favor of purchased power. The old engine room is now a substation and contains a conversion set consisting of a 300-hp. synchronous motor direct-connected to two 150-kw. d.c. generators. In the same room is a 75-hp. gasoline engine generator set which serves as an auxiliary power source for the fan. The washer, which is adjacent to the tipple, contains two 400-ton Montgomery jigs.

During a month when 31,799 tons was produced at the Powhatan operations the 15-minute power demand was 430 kw., power consumption was 165,600 kw.-hr. and the cost was $1,951.70. This is a consumption of 5.22 kw.-hr. per ton. The unit costs were 1.18c. per kilowatt-hour, or 6.14c. per ton.

Powhatan No. 2 mine loads about 400 tons per day. Formerly it was the practice to crush and wash the whole tonnage but recently a 4-in. screen and a picking belt were installed.

At the No. 2 mine only one locomotive is used. This one and those at the No. 1 mine are equipped with bolted-type demountable tires.

Summit mine of the Alta Coal Co. is at Sumiton, in Walker County. This operation, which produces 500 tons per day from the Flat Creek seam, is 15 years old.

The coal is brought up a 7-deg. slope 2,200 ft. long in 20-car trips by a single-rope hoist. The power is a slip-ring motor rated at 112 hp. 550 volts. The height of the mine cars is but 20 in. and their average capacity is 1,800 lb. At the tipple they are handled over a Phillips crossover dump.

The seam, which is 28 in. high, is mined by the room-and-pillar method but no pillars are taken. Cutting is done with five shortwall machines equipped with 220-volt a.c. motors.

Instead of the usual practice of taking the a.c. power into the mine at 2,300 volts it is taken in at 550 volts.

Coal shipped from the Summit mine runs very low in ash—2.1 to 3 per cent—and the heating value averages about 14,250 B.t.u. The washing plant is equipped with two "American Concentrator" jigs having automatic float-controlled slate gates. Four grades of coal are shipped: over 3-in. lump, 1½ to 3-in. nut, under ½-in. and a steam coal made up of 3-in. and down.

Alden Camp in the Making, Aug. 16, 1928

50 YEARS
Added to Life of Flat Top Mine

By J. H. Edwards
Associate Editor, Coal Age

◆

ALDEN, the new town built this year by the Sloss-Sheffield Steel & Iron Co. at Flat Top mine, is one of the finest company-owned villages in the country. The construction program of which the town was a part included the driving of a rock slope nearly 1,000 ft. long and fitting it for use as a manway.

The occasion for such an expenditure on an old mine was repossession July 1, when the State of Alabama turned the mine back after operating it for many years with convict labor.

Under state operation few houses were needed. The mine crew, numbering over five hundred, was housed in a prison building near the main slope and tipple. Because of the rough ground and the distance from the active mine workings, this location was undesirable for a town site. About 4½ miles from the tipple and almost above the farthest workings of the mine is flat ground large enough for company buildings, and adjacent to it is beautiful upland timber.

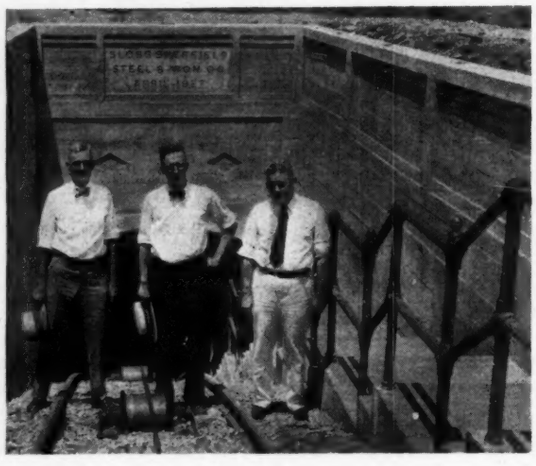
The manway, which was needed also as an additional intake airway, was driven with the portal a few hundred feet from the flat, and the town was built near by where consideration for the comfort of the employees dictated that it should be located.

The slope is driven on a 30-deg. pitch through rock and it is 981 ft. long. The passage is 9 ft. high and 12 ft. wide. Along one side is a concrete "safety tread" stairway and in the remaining space is a track for handling material and hoisting men.

Considerable thought was given to the engineering design of the stairway, safety being the principal consideration. The stair width is 4 ft. and the steps have 7½-in. risers and 11½-in. treads. Every twenty steps there is a 41-in. landing. This design makes it possible to use the standard tread and rise and also provides a stopping place for a man in case he should fall and roll down several steps. Another advantage of the construction is that the landings break the monotony of the climb and provide convenient points for rest.

The wearing edge of each step is formed by a steel tread 3 in. wide and 3 ft. long containing abrasive inserts. These treads are especially valuable in keeping a man's heels from slipping as he walks down the stairs.

New Portal at Alden End of Flat Top Mine. Left to Right: J. Gray Hamlin, Construction Engineer; T. B. Dryer, Assistant to General Superintendent of Mines; H. J. Thomas, General Superintendent of Mines.

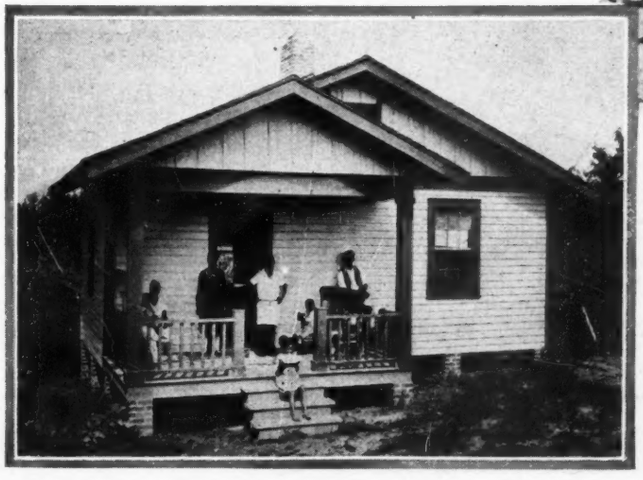


For the entire length of the slope the track side of the stairs is guarded by a handrail of 1½-in. pipe. Cast into the concrete base of the stairs is a 3-in. fiber duct which carries a 1,000,000-circ.mil d.c. feeder and a Tirex telephone cable. The duct, which is practically 1,000 ft. long, is provided with a manhole at a landing half way up the slope.

Alden, the new town near the manway portal, was named after Ruth Alden Thomas, ten-year-old daughter of Howard J. Thomas, general superintendent of mines. The company

Types of Buildings in New White Camp of Sloss-Sheffield Steel & Iron Co. at Alden

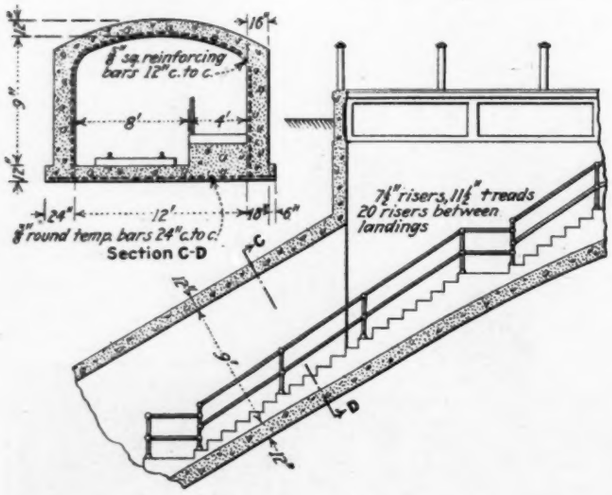
Bathhouse at Alden Camp in Process of Construction



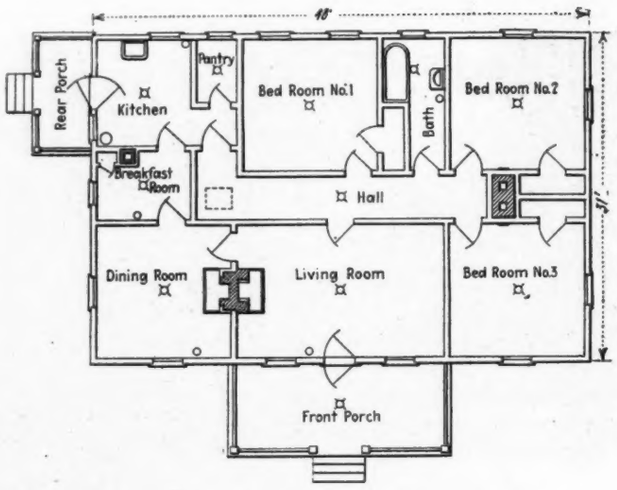
A Study in Contrasts

Above, One of the Old Dwellings —Originally a Log Cabin—for Colored Workers at Alden

Left, One of the New Houses Erected a Few Weeks Ago



Safety Stairs, Manway Construction



Floor Plan, Officials' Houses

buildings of this village are located on the ground formerly occupied by the beehive coke ovens of the old Blossburg mine. All of these buildings are faced with red brick and are of fireproof construction except that the shelving and counters in the commissary are of wood.

Besides the commissary there is an office, bathhouse, medical dispensary, supply house, heating plant, and filtration plant where mine water is treated for domestic use. A building at the portal of the manway houses the electric hoist, substation equipment and check room.

One hundred and sixty dwellings have been built; 80 for white people and 80 for colored, segregated in two groups. Of the 80 houses for white people ten are official houses that are located to one side of the white camp. All houses are one-story frame and have running water inside.

The official houses have six rooms, not counting the bath, breakfast room, and so on. There are five of one design and five of another. Convenience to the housewife was the first consideration in selecting the plans. Houses are well supplied with electrical outlets.

The official houses are located along winding streets on a rise that is shaded with beautiful oak trees. The building lots are 75x150 ft. or larger. Lots on which the other houses are located have a minimum size of 75x100 ft.

These other houses, equally attractive in their class, consist of two-, three- and four-room sizes. A feature of the construction is that the ceiling used for the lining is all end-matched. Variety in outside appearance is obtained by slight differences such as location of porches and by using different colors of paint.

For the promotion of sanitation, which was given special attention, the company buildings and official houses are provided with septic tanks and the other houses with pit-type toilets. Fire hydrants are installed throughout the town.

Community buildings consist of two churches and white and colored schools. Recommendations of the State Board of Education were followed in all respects in the school-building design. All light is admitted over the left shoulder, lunch rooms are provided, and toilets installed inside of the buildings. Playgrounds and a ball park provide outside amusement.

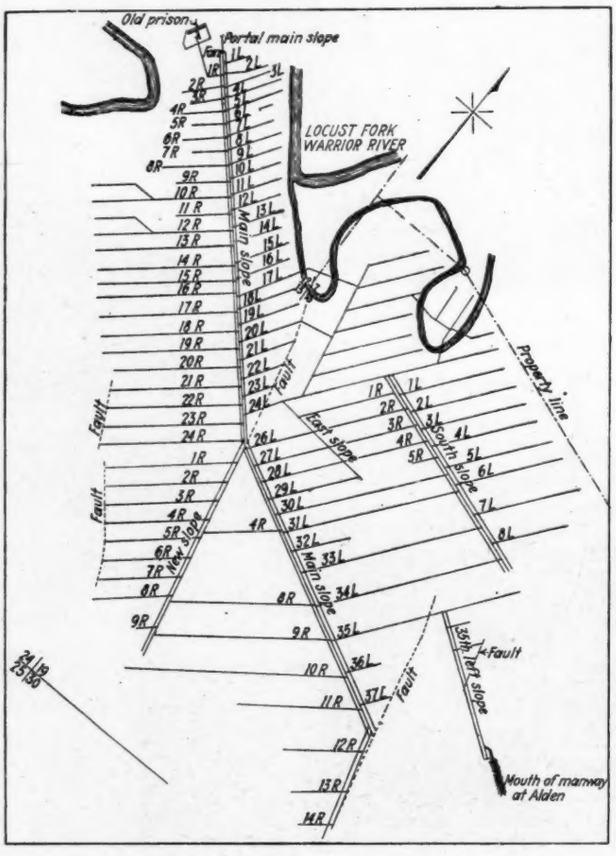
According to Mr. Thomas the new slope at Alden may serve an additional purpose before long. This will be for transporting the output of the Blossburg mine through the Flat Top mine so that it can be hauled to Birmingham on the company's own railroad, connecting Flat Top with its byproduct plant at North Birmingham.

The Blossburg mine is a drift operation. The plan is to chute this coal into the Flat Top mine through a pipe installed in the manway slope. It would then be hauled 4½ miles through the mine and be taken out through the main slope, where the washer is located.

Work on the manway, which was started June 8, 1927, and completed, including the concrete work, in practically a year, was under the direct supervision of T. B. Dryer, assistant general superintendent of mines.

A new four-room school building for white children was completed about the middle of September and the formal opening took place Sept. 24. Later in the week the finishing touches were put on the building for colored children, the doors being thrown open for pupils Oct. 1.

Manway and Mine at Alden



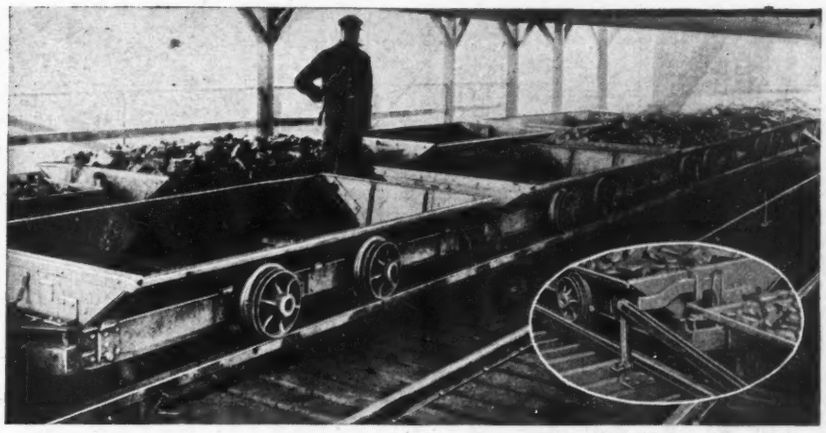
Getting Down to First Causes

AT SIPSEY MINE

WHAT a few master strokes can do to make an operation more profitable is well illustrated at the mines of the DeBardeleben Coal Corporation, where notable improvement has been made in transportation and safety.

At the Sipsey mine of the company there were in the early part of the present year 500 wooden cars in fair condition but 14½ years old and therefore of antiquated type. Their capacity was only 1,400 lb. Most companies would have tried to build up the sides of the wagons and put up with their other inadequacies, but Milton H. Fies, vice-president and general manager, with W. M. Lacey, the general superintendent, eastern division, and L. V. Harville, engineer of that division, after a visit to Kentucky to see the equipment in that state, decided to scrap the entire car equipment and replace it by 350 roller-bearing drop-bottom steel cars of Sanford-Day type and 2,500-lb. capacity. The gage of the track, fortunately, was of liberal dimensions, namely 42 in. A car was installed that measured 12 ft. from bumper to bumper, had a 38-in. wheelbase, was 10 ft. long in inside measurement, had 14-in. wheels and stood only 21 in. above the rail. Its outside width was 5 ft. 2 in.

The introduction of these cars has enabled the company to transfer 42 men to the loading of coal—indeed the car has made it more than necessary to transfer these men, for whereas with the old car the daily output was 900 tons it now averages 1,371 and the maximum has been 1,800 tons. As much as 29 tons has been dumped in one minute on one of the two tipple tracks, which is at the rate of 58 tons per minute for two tracks. The speed of dumping aids the locomotives, of which there are 10 to do a larger day's work.



The Dump, Showing How the Doors Under the Cars Are Tripped Into 100-Ton Bin Below Track

With 42 fewer men working on transportation in all its many phases, 500 more tons, or about 50 per cent more coal, has been loaded. Among those transferred have been three repairmen, for the cars that went to the junk pile took that number to keep them on the track. Those transferred include also eight men on the night shift who were kept busy unloading rock and two men who worked in the power house at night, supplying power for the hauling of rock on the night shift.

The Cemetery of Obsolescence

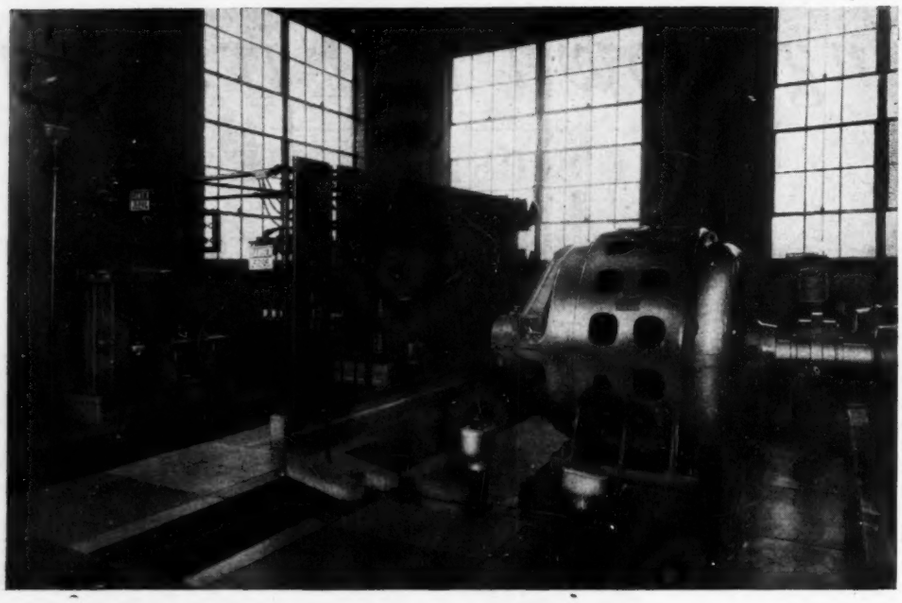
The experiment has so entirely justified the expenditure that the mine at Empire has already replaced its old cars in the same manner. The mine is now producing 1,400 tons daily and has a maximum output of 1,669 tons in a day, whereas prior to the installation of the cars this mine, which is nearly 40 years old, produced only 1,000 tons daily. To James M. Cobb, the safety inspector, the new cars commend themselves as a safety measure eliminating many hazards.

The increased capacity has justified itself for there is no difficulty in marketing the coal, the seam at Sipsey being the Black Creek. Fine coal can be washed on tables down to 3 per cent ash. The jigs wash the coal and give a steam-coal product the ash of which will run under 4 per cent. The washed coal is kept always under chemical control. The worst coal sample obtained in drilling the seam ran 1.66 per cent ash and face samples of 1.20 per cent have been obtained.

Two Elmore jigs wash the screenings, which include all coal 1 in. and under; one large Elmore jig handles the nut coal, which runs from 1 in. to 3 in. Egg, which lies between 3 in. and 5 in. is hand-picked. All the large coal is sold as fancy lump. This also is hand-picked. The egg and lump are transferred from the picking tables to the mine cars by loading booms.

In the neighborhood of Sipsey the rivers begin to break into the big plateau with steep-sided valleys of

(Turn to page 636)



Section of Pipe Duct Cover Removed to Show Construction

SAFETY *and* EFFICIENCY

Key to Improvements At Virginia Mine

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ORDERLINESS and neatness are almost invariably indications of efficient management. Some men cannot keep a brand new plant in order but others can keep an old plant "as neat as a pin," even though spending money on it is taboo.

Coal mines of the Gulf States Steel Co., of Alabama, have gained the reputation of being well regulated inside and out. Up to last year Virginia mine of this company, a 600-ton operation, was operated by steam equipment some of which was many years old, yet the appearance of the plant was always pleasing. Now the hoist and fan have been electrified and other improvements made on the outside and in the mine which make it an outstanding operation of the state.

A synchronous motor with auxiliary drive on the fan, a 600-hp. hoist embodying several novel features, conversion of the inside substation to full automatic control, a change from 55-lb. to 80-lb. rail on the main slope and a new bathhouse are a few of the improvements already completed. Included in the program but not started yet, is a steel tipple with an eight-car rotary dump designed for a normal capacity of 1,000 tons per day. Solid cars will then replace the endgate type now used with the crossover dump.

The electric hoist installation is a model of simplicity, good workmanship, pleasing paint job and of consideration given to the little things which only the operating man appreciates. The duty of this hoist is to handle 10-car coal trips and man trips, with single rope on a slope 2,910 ft. long. It is a Vulcan equipped with plane cylindrical drum, gravity-set oil-operated post-type brake, Webb trip recorder and Lilly control with man hoisting attachment.

Except for a narrow slot for the rope, and even this is cased to the building wall, the drum is completely housed so that the rope lubricant cannot drip into the drum pit and cannot splash onto the hoist-room walls and floor.

In order that the operator can observe the spooling of the rope on the drum, a large segment of the housing is made of curved glass. The concrete pit under the drum drains to a tile, and a water hose is installed in the pit for washing out any dirt which naturally tends to settle in it.

An Allis-Chalmers 600-hp. 2,300-volt slip-ring induction motor drives the hoist. The control, made by the Westinghouse Electric & Mfg. Co., is of the contactor resistance type. It is interesting to note that blank panels were not installed for "looks" in the unused bottom portion of the control board. That was not necessary. The equipment back of the board is so neatly arranged and painted that there is no reason for hiding it by blank panels.

Conduits, oil pipes and ground wires are installed in a manner which allows changes or repairs at minimum expense and without causing unsightly damage to the floor. All are concealed in concrete ducts 18 in. deep and 14 in. wide fitted with removeable top sections of precast concrete. End sections have holes in which to hook eyebolts to facilitate raising. Removing an end section makes space for prying up succeeding sections with a bar.

The floor, walls and ceiling of the building and the hoisting equipment

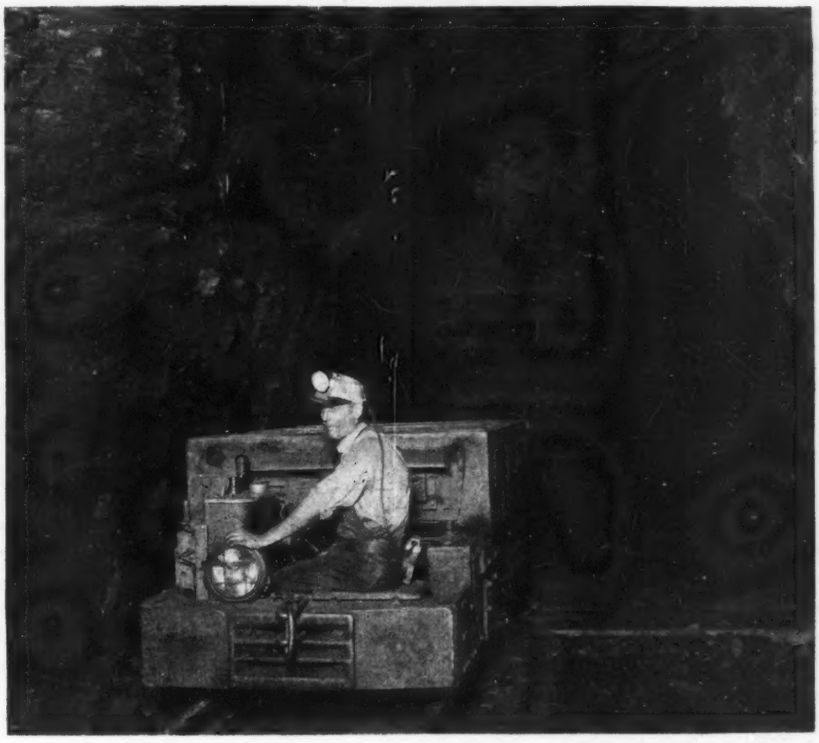
are painted with Duco. The floor is a checkerboard effect with two colors. On the machinery and building interior six colors are used. The effect is such that only the most slovenly individual would allow the place to get dirty.

For about three-fourths of the travel the empty trips are lowered with the motor acting as a speed governor and brake. The power flow back to the line is 25 to 30 amp. at 2,300 volts, as compared to 75 to 190 amp. consumed during the hoist. This regenerative braking is effected by moving the controller to the full-speed lowering position, which cuts out all resistance and limits the motor speed to a few per cent above hoisting speed.

Departing from the usual practice of installing induction motors on fans, a synchronous motor was purchased for the Virginia fan. This motor is of the standard type rated at 220 hp. 2,200 volts, and is fitted with direct-connected exciter. Pull-in of the motor when starting the fan is effected by closing doors installed in the air passage near the fan.

Because the mine is gassy provision has been made for standby power. This consists of a Stirling "Dolphin" eight-cylinder 300-hp. gasoline engine fitted with friction clutch. Silent chains and Falk couplings are used for the drives. In case it should become necessary to disconnect the synchronous motor from the fan this can be done in a few minutes by removing the spring-steel lacing from the coupling.

About 3,600 ft. from the present fan an airshaft 330 ft. deep has been completed; also an escapeway slope has been driven to the surface. At the shaft another fan will be installed.



Timbering the Main Slope

A bathhouse for colored workers was put into service in July. The building is 36x66-ft., has a 16-ft. ceiling, and accommodates 200 men. It consists of two 27x36-ft. change rooms, one for clean clothes and the other for work clothes, separated by a 12x36-ft. shower room.

Just Before the Bath House Was Put Into Use

Chains supporting the hanging pans and clothes hooks are terminated about 3 ft. from the floor at pieces of 1½-in. galvanized pipe, each 15 in. long. When the pans are raised these pipes contain the surplus chain. Holes at the top of the pipes permit padlocking the chains in that position.

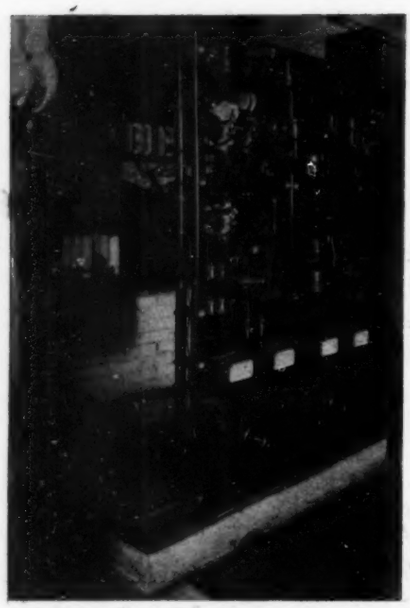
As a precaution against burns, radiators in the clothes rooms are guarded with screens. Piping in the shower room is marked "Hot" and "Cold."

A recent improvement inside of the mine was the change of a 200-kw. 275-volt synchronous converter to full-automatic control. The equipment, supplied by the Cutler-Hammer Mfg. Co., includes a feeder panel made by the Automatic Reclosing Circuit Breaker Co.

The new control is now saving the cost of one man. Were it not for pumping and battery charging, which require some attention at night, the saving would be two men.

Very little of the old hand-control apparatus could have been utilized as part of the automatic and it had no appreciable value, therefore it was left intact as a standby in case of trouble with the automatic. A triple-pole double-throw switch effects the change from one control to the other.

In addition to considerable grading and the change from 55 to 80-lb. rail, improvements to the main slope



Automatic Control in Foreground and Manual Control in Background

include timbering over much of the length. Along sections where the roof had fallen to a considerable height the ribs were trimmed and crossbars consisting of two 90-lb. rails installed 10 ft. apart. On top of these, and at right angles to them, 60-lb. rails were placed as supports for cross-lagging consisting of 3 in. to 6 in. of wood.

Safety is truly the first consideration in determining mining methods in Virginia mine. It was the first mine in Alabma to be put on electric cap lamps. Mining machines are not used, and even the battery locomotives are not allowed to go into rooms.

The mine is worked on the room-and-pillar system and no pillars are removed on the advance. The rooms, 24 ft. wide and 150 ft. long, are separated by 30-ft pillars. Crosscuts are made every 50 ft. or closer in all headings and rooms. All places are examined before shooting. Only permissible explosive are used. The shots are fired only at night and then by experienced shotfirers using magneto blasters.

Triple doors are used on the main haulways and double doors on the headings. These are spaced the length of a trip apart. All stoppings are built of rock, 8 ft. deep, and with three rock walls plastered with a "50-50" mixture of cement and a red clay that is practically free of sand.

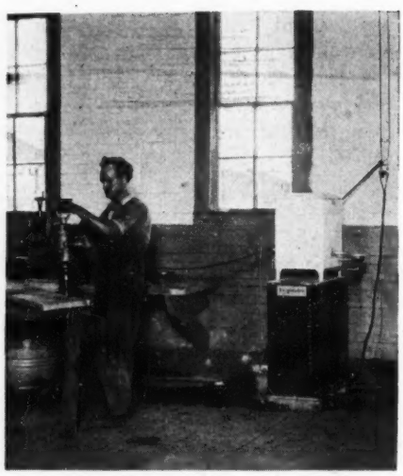
The coal seam, known as the Nickel Plate, averages about 57 in. in thickness. Above a 21-in. bottom bench of coal is a 6-in. parting of fireclay. The remaining 30 in. of coal is split by 2 in. of rock located about 6 in. from the top. All of the top bench is pick mined without explosive. Permissible is used in the bottom bench.

No electric wires are allowed within 2,000 ft. of the face. Main haulage is done with two 10-ton trolley locomotives and the gathering with four straight-storage battery locomotives equipped with Edison batteries.

Rock dust is now the principal defense against coal dust, water being used only to sprinkle the bottoms of the headings. All rooms and headings are dusted to the last crosscut and rooms are given a "100-per cent" dusting before the rails are removed. Hand dusting is done only in rooms. The power duster, normally driven from the 275-volt trolley, is equipped also with a 110-volt motor for driving from a battery locomotive. This power is used where trolley wires have not been extended.

Taking samples of accumulated dust from various parts of the mine and testing these samples is done every fifteen days. This eliminates the guess work which in so many mines has made rock-dusting nothing but a farce.

The pipe lines for sprinkling the bottom on headings have connections every 80 ft. for attachment of hose. A further use of water is at the tipple, where the empties are given a thorough spraying before they enter the mine.



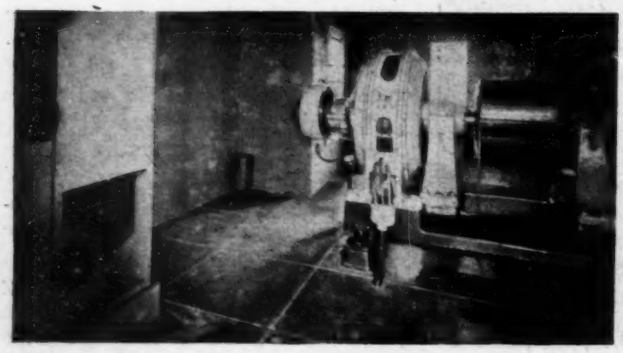
Water Cooler in Machine Shop

Referring again to the outside equipment, the machine and car shop contains several interesting features. On the inside wall is painted a "Bulletin of Service" containing the names of employees who have worked at the mine fifteen or more years.

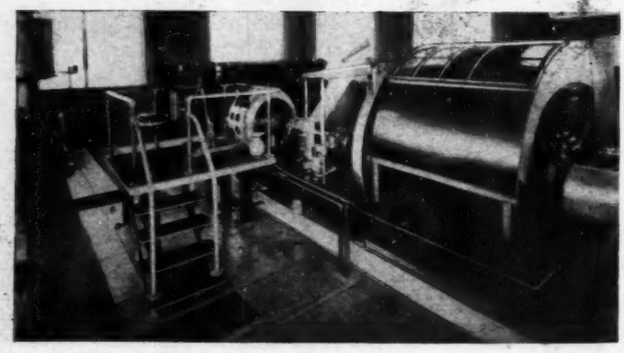
This shop building is of modest dimensions and the equipment not elaborate, but the same orderliness and cleanliness prevail. The equipment items, including a forge, shaper, lathe, power saw, drill press, grindstone and wood saws, are painted with Duco. The same make of paint is used on the line shafting and hangers, yellow being used on the former and blue on the latter.

In the shop can be found a key to the question, "What influence holds the men so well at Virginia mine?" In this building is an electric water cooler where, regardless of how hot the day may be, the men can step up to a sanitary fountain and get their fill of sparkling cool water. This cooler, equipped with a small domestic refrigerating unit, costs little to operate, but is one of the many things done to make the job more pleasant.

Synchronous Motor in Fan House —a Departure from the Usual



Main Hoist Showing Glass in Drum Shield



Longwall at Montevallo

Has Seen Many Changes

By B. C. Moore

Superintendent
Montevallo Coal Mining Co.,
Aldrich, Ala.

MONTEVALLO, where the Aldrich mine of the Montevallo Coal Mining Co. is located, is one of the old towns of Alabama. The Fancher mine was opened there by local people with native labor as far back as 1834, when Andrew Jackson was serving his second term as President of the United States. Germans and Irish were later employed in the mine. Slack lime was used to shoot down the coal. Since early in 1906 it has been worked as a longwall mine.

In the early fifties a man from Selma, Dallas County, by the name of Baker opened up a mine which was named after him. Later Eugene A. Smith, who served for many years as state geologist and recently died, leased the mine. T. H. Aldrich, who now resides in Birmingham, took hold in the early seventies. W. F. Aldrich a mining engineer and geologist, took the property over in 1885 and built a home at Montevallo, operating the mine till 1905.

P. B. Thomas, who was born in 1850 at Easton, Pa., and attended school at Hazleton, Pa., with his associates purchased the mine of Mr. Aldrich in 1905 and introduced longwall. Mr. Thomas had lived for two years at Thurber, Texas, where he had some experience in operating that system of mining for the Texas Pacific Coal Co. The knowledge gained there influenced him to operate the mine at Montevallo by that method. The type he chose was a circuitous longwall worked to the rise. At the time he came to Montevallo Mr. Thomas had been in Alabama 26 years, for he arrived at Helena, Ala., in 1880. He opened up Blocton mine in that or the following year for the Cahaba Coal Mining Co. The Tennessee Coal, Iron & Railroad Co. later took over the Blocton plant.

IN 1913 the Thomas interests sold out to W. S. Lovell. The mine was shut down in 1923, when it was purchased at bankruptcy sale by Darius A. Thomas, the son of P. B. Thomas, who still owns it, operating it as the Montevallo Coal Mining Co. The mine has much historical interest.

It was the first operation in Alabama to ship coal to market by railroad. That was in 1856. It was the first in the state to give its coal a trade name. The operator had to go to the consumer and show him how iron baskets could be made and installed for burning the fuel. The first hoist used in the Alabama coal fields was introduced at Montevallo, and boilers were brought from Wilkes-Barre, Pa., to operate the hoist.

Loading Head Lifts Coal Over Side of Mine-Car Trip

Coal from this mine was used during the Civil War to build ships on the Alabama River at Selma and to make cannon at Shelby. Since 1906 longwall has been in continuous operation. Chain conveyors were installed in 1917 and two shaker conveyors of Mavor & Coulson make in 1921. Since then eight have been made by the Anniston Electric Steel Corporation, Anniston, Ala., a firm no longer in business.

Thus the Montevallo mine has always made history and is still making it. The seam has a working height of from 50 to 52 in. and sometimes even 60 in. The top is a rash from 4 to 6 in. thick, the top coal is from 18 to 24 in. thick; below it is slate of 12 to 16 in. thickness and under that is a bottom coal running from 6 to 10 in. Thus the net coal will run from 32 to 34 in. When the slate parting is gobbed the roof does not have far to descend.

THE mine has already been described in *Coal Age* in an article appearing Dec. 31, 1925, Vol. 28, pp. 915-919, by J. H. Edwards, but since that time many changes have been made in operating methods. Only that part of the map which relates to the new work is shown, as the mine is quite extensive and was illustrated in the preceding article. The track no longer is lowered to permit the shaking conveyor to load directly into the car. A Lorain loader head, or elevating boom, that lifts the coal from the shaking conveyor to the right elevation for depositing it in a car is provided on three out of five of the walls. This is one of the principal changes since the Edwards article was written. Roof is taken

instead of bottom in all roadways.

The engine of the shaking conveyors is connected by means of wire rope so that the engine need be moved only about once a month, when the wall will have advanced about 100 ft. The walls are driven with respect to the pitch so as to place the conveyor on a 2 to 15 per cent grade in favor of the load, thus maintaining a good capacity. The best performance is obtained when the grade is 6 per cent.

As the working height of the seam is 50 in. with only a little brushing, adequate height would be provided, but that would not suffice for longwall working because of the heaving of the bottom. So the roadways are made 9 ft. high. They heave about 2 ft. 6 in. lowering the heading to about 6 ft. 6 in. The overburden where the mine is now being worked is from 1,050 to 1,100 ft. thick.

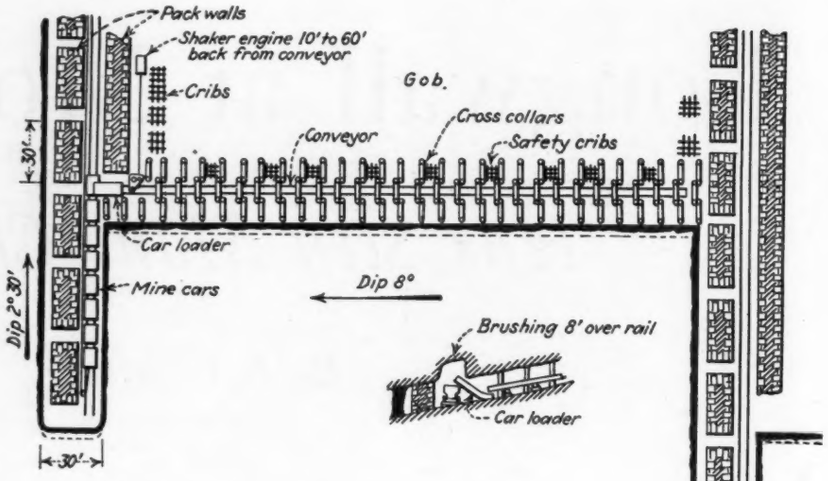
Some very violent breaks have occurred in the gob back of the wall faces but there has been no evidence of this in the roadways and none on the surface. After 6 to 8 months the roof comes to rest, and there is no more settlement.

WHEN top brushing was substituted for bottom lifting, the packwall on the side of the roadway nearest to the long face was made 17 ft. wide. This, however, was too stiff a manner of supporting the roof. The packwall would not give way sufficiently, so the bottom clay heaved. In consequence the packwall has been narrowed to 12 ft. It may have to be made narrower yet, as the floor in the roadway sometimes heaves as much as 4 ft. Even if the heaving cannot be stopped and the bottom has to be lifted, however, the top should be brushed instead of the bottom, because the drawslate, which is 3 to 5 ft. thick, is thereby removed and the top is arched. Therefore the roof is in much safer condition. An effort is made to get all the drawslate when brushing. In consequence of this, the roadway expense has been cut 50 per cent. No roadway timbers have to be set.

Experience has shown, moreover, that the walls working off adjacent entries should be either within 30 ft. of each other or more than 300 ft. apart; otherwise the roof in the entries will fracture badly. The roadway headings are kept 60 to 70 ft. ahead of the long faces.

Reference to the map to the right will show how No. 33 longwall has been kept back of No. 32 and No. 31 back of No. 30. Where this has not been done the roof in the entries has fallen to considerable heights. It also will be noted that the headings are extended beyond the longwall faces into the solid coal. The simplicity of the layout is another feature that the map indicates most convincingly.

A 9-ft. pack is built between the roadway and the rib of the heading on the far side from the longwall face. Every 30 to 40 ft. openings are left in this packwall so as to provide a shorter path for the ventilation of the adjacent wall. The 9-ft. pack is built 4 ft. clear of the heading rib so as to provide for an aircourse.



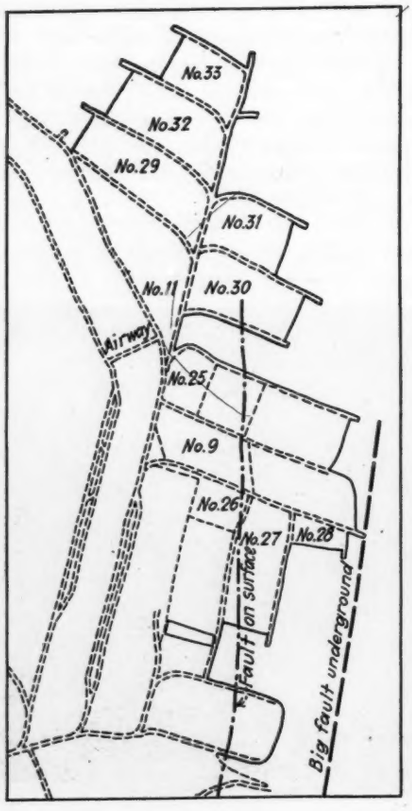
Method of Advancing and Protecting Longwall Face

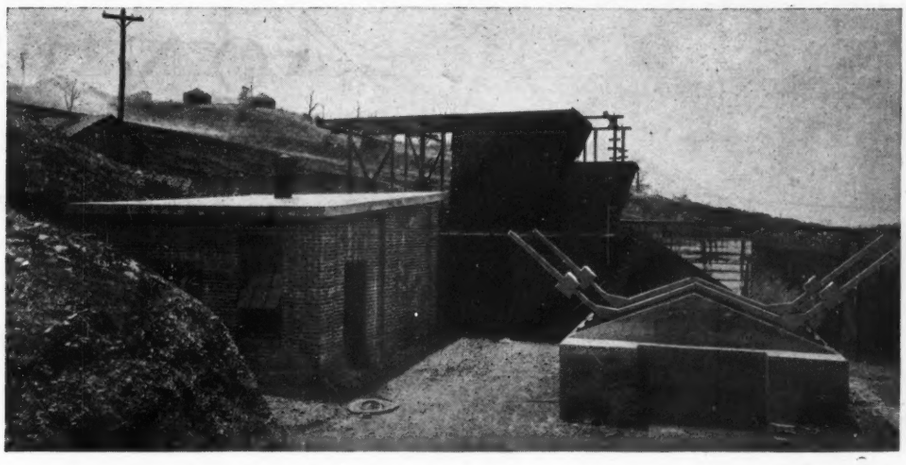
Experiments will be made with the Langham collapsible jacks of the Lorain Steel Co. Enough have been purchased for the operation of one wall. The conveyor pans are now fastened together by 1-in. bolts with lock washers. The mine makes little water because the coal is removed in a methodical way with minimum crevicing and because the depth of the measures is considerable, the coal is not thick and all the rock is left in the mine. The same control pumping station handles all the water as it did fifteen years ago. There has been no change either in location or capacity.

For preventing empty cars from running away a magnetically operated track switch has been installed at the top of the slope which acts as a derail in case a car gets loose or the trip breaks on the outside of the mine. This switch is normally open and in order to close it and keep it closed the hoistman must press a push button provided for that purpose.

The mine, which was leased by the state from the Montevallo Coal Mining Co. and operated by convict labor, has been running since July 1 with free labor. Because of the change it has been necessary to commence the construction of 50 new houses to be painted inside and out and supplied with electric light and filtered water. No wells will be permitted. A new 300-man bathhouse for colored employees has been erected. A similar bathhouse will be provided for white men.

More Recent Workings of the Aldrich Mine





Explosion Doors Are Counter-Weighted

New Fan Provides Safer Ventilation

At Lower Operating Cost

HIGH speed multi-cylinder gasoline engines suitable for mine-fan standby service were not available until after a large number of mines had been electrified. As a result many steam engines were kept in use as primary or auxiliary drives for fans at gassy mines. But the pressure for greater economy and reliability is crowding the steam engine into the discard for this service. Now the last word in fan drive at a gassy mine is a synchronous motor normally operated from high-line power and an auxiliary motor of the induction type, either of which can be operated in emergency from a gasoline engine-generator set.

This is the type of installation recently completed at Bessie mine of the Sloss-Sheffield Steel & Iron Co., Maben, Ala. The method there used of effecting pull-in of the synchronous motor by choking the air current has been employed in but one or two other instances in this country.

The Bessie installation includes a new double-inlet multi-bladed 9x3½-ft. fan erected beside the old 18x7-ft. fan that required a 250-hp. slip-ring induction motor. To the steam engine, also used with the old fan, only enough steam for cushioning was admitted. This engine was direct-connected, therefore it was necessary to stop the fan once a month for engine inspection. Because of the large volume of gas generated by the mine, this was an expensive and annoying job. But the greatest disadvantage was the boiler plant expense. Now that has been wiped off the cost sheet, and the electric power cost is less because of the higher efficiency of the new fan and the power-factor correction of the synchronous motor.

The new fan has two motors, one connected to each end of the shaft by silent chain. Square-jaw clutches are interposed so that either motor can be stopped for repairs. The silent chains are housed in oil-tight cases and the oil is circulated onto the chain by pumps.

The drive serving as the spare is the 250-hp. 2,300-volt slip-ring motor removed from the old fan. The regular drive is a new 175-hp. 2,300-volt synchronous motor with direct-connected exciter. The present fan speed is 212 r.p.m., the water gage 3.58 in., and the volume delivered 158,000 cu.ft. per minute.

Although the synchronous motor is of generous size, it will not pull into step when starting the fan if the air current is allowed to increase normally in velocity. To get around this difficulty during starting, the fan discharge is closed by a steel gate over the stack. This gate, which lies horizontal, is on rollers

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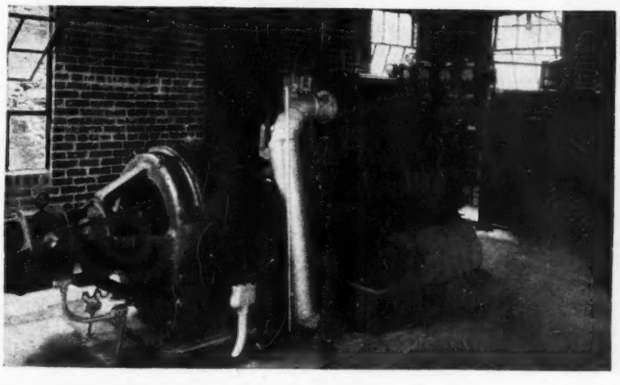
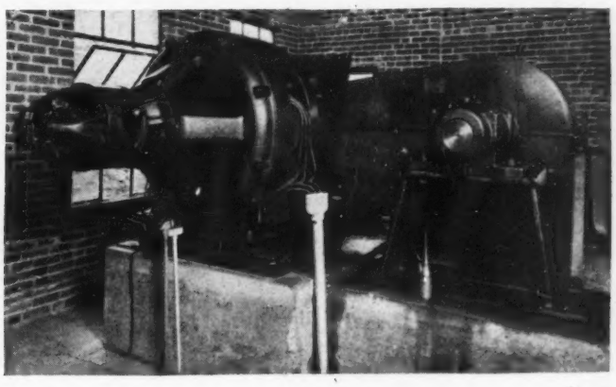
Engine Generator Installed in Motor Room



Synchronous Motor and Silent Chain Drive



ON WITH

Art and Nature Joy of To Children of

BACK-BREAKING toil in Stygian darkness; sunless, grimy hovels for homes where pale, listless and undernourished children drag at the skirts of querulous mothers; habiliments and habitations which insult the beauty of Nature's background—this for years has been the standardized fictional dramatization of life in a coal-mining community. But truth is stranger than fiction—even in the coal industry. Whatever foundation the past may have given for such drab pictures, these foundations have crumbled to dust and the dust has blown away in model mining camps.

The vision of modern industry goes beyond the machinery which has made this age the wonder, the scorn and the despair of its critics. American mammon is stripped of the devouring attributes of its Syriac prototype. Industrial leadership recognizes its material obligations to its co-workers and their wives and children.

Men who toil must be well housed and well fed if they are to be effective partners in the creation of national wealth. Nowhere, perhaps, are these truths more clearly understood than in Alabama, where prominent coal operators take a real pride in raising the living standards of their camps.

Interest does not stop with making provision for mere animal comforts—a well-filled belly and a warm place to sleep. Facilities for wholesome recreation in the play hours of the workers and their families are an integral part of the picture.

Education for the younger generation is not neglected. Not satisfied with the limits set by state funds allotted for educational purposes, operating companies in many cases have supplemented these appropriations with money from their own treasuries so that the children of the mine workers may have greater educational and cultural advantages than the state unaided would provide.

Ancient Greece had a concept of physical perfection as an ideal of beauty that again is finding wide acceptance after generations during which the survival of this concept was threatened first by a morbid zeal for the mortification of the flesh and later by a crass materialism which held creature comforts the goal of common existence. The validity of the Platonic dictum that the aim of education is "to develop in the body and in the soul all the beauty and all the perfection of which they are capable" is as freely admitted in the shadows of Red Mountain as in the halls of the more advanced schools of pedagogy.

The development of the expression of the inherent grace of the child, for example, has a definite place in the physical education program of the schools of the Woodward Iron Co. Each class is given a 25-minute period of instruction in this feature of the educational work each day under a special instructor and the work for the system is supervised by a trained director.

This director visits all schools at least once a week and conducts special classes for the instructors. When the program was inaugurated five years ago the classes for the instructors were

THE DANCE!

Allied to Teach Living Mine Workers

BEAUTY AND RHYTHM are the natural birthright of childhood. Too often, alas! the birthright is snatched away by misguided elders so intent upon teaching youth the serious business of life that they crush out the joys of living. In the shadows of Red Mountain, however, the expression of beauty and individuality is not repressed but encouraged as part of the educational program provided for the children of Alabama coal miners.

held monthly but during the past year classes for the instructors in the white schools have been held weekly.

Special attention is paid to rhythmics and natural dancing and monthly outlines giving detailed instructions are furnished the teachers. This group develops the plans for the May Fete pageants which are the culminating feature of the year's work in physical education.

Each class of children is given several minutes' instruction daily in exercises and marching to stimulate activity, correct posture and for educational value. These exercises are graded according to the age and sex of the pupils. In the primary classes the play spirit dominates, with exercises such as "blowing a soap bubble" and "blowing out a candle" to inculate deep breathing by the children.

Stress is placed upon corrective exercises to improve posture. Competitive posture tests are held monthly at which all grades compete for the best record in standing, walking and exercises. Care is taken, however, to guard against the work becoming formalized and a constant effort is made to strike a proper balance between spontaneity and intelligent direction. Boys and girls receive separate class instruction after the fifth grade.

The semi-formal exercises are followed by more informal activities such as rhythms, games and dances. Simple rhythms—stepping, skipping and galloping—are done to music furnished by a Victrola. From these simple exercises the older classes are led on to group work in folk and natural dancing.

The daily program also is varied according to the class by interspersing it with story and song games for the younger children and competitive games, such as basket ball and volley ball, for the older groups. This work is tied in with the season of the year; for example, mimetic games for going nutting in the autumn, Indian braves' peace dance at Thanksgiving and appropriate Christmas activities.

For the major holidays, such as Thanksgiving and Christmas, special programs are built up from daily exercises. Last Christmas, for example, some of the schools presented programs illustrating by pantomime folk dances and games how the holiday is celebrated in various lands. Where possible programs of folk dancing and singing are given

around community Christmas trees.

Except when weather prevents, the playgrounds are used for these classes throughout the school year. When the weather is inclement the classes are held indoors and the program varied to suit the occasion. At such times the classes are kept interested by simple exercises, games, interpretive dramatization and rhythmic work.

In May of each year all the white schools combine for a pageant and a similar fête is held by the combined negro schools. The basis for these pageants is the regular class work done throughout the year. The theme of the May pageant of the white schools this year was "An Old Fashioned Garden." This pageant was participated in by 500 children. It was held outdoors in attractive natural settings and the children were dressed in costumes which had been made by the domestic science classes and by the mothers of the pupils.

The illustrations appearing on this and the two preceding pages show some of the groups which participated in the last pageant. The children were costumed to represent the popular flowers of the informal gardens of grandmother's day, such as hollyhocks, roses and wistaria. Some of the younger boys were encased in pseudo-rabbit skins and gamboled on the greensward as the bunnies so dear to the heart of childhood. Older pupils were called upon for interpretative dances. The sturdy bodies and limbs of the dancers were mobile evidence of the value of proper diet and the proper physical training for youth.

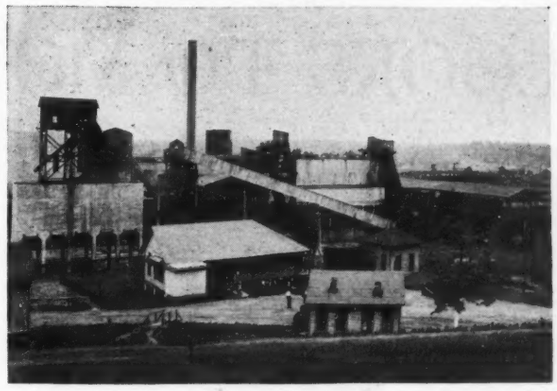
During the past summer vacation classes were held. Attendance at these classes was voluntary. As a result of the additional time so given it is expected that more comprehensive work will be possible the current school year in musical appreciation, rhythmics and dancing. The children will develop simple pageants from fairy and folk tales and produce them informally.

This fall it is planned to hold a monthly outdoor pageant at each school as a means of heightening interest in the work. Older boys will be directed in preparing suitable settings, lighting effects and decorations; the girls' sewing classes will make the costumes.

Sickness often is caused by bad carriage and the body often starves for lack of deep breathing. The dancers get the carriage and exercise they need without the deadly monotony of the "daily dozen."

The education activities at Woodward are under the general direction of Miss Mary Weber. Miss Gertrude Ware, a pupil of the late Isadora Duncan, is special instructor.

CONVEYORS *Aid in Obtaining Stronger Pillars*



WORKING a seam in which the rock partings total 25 to 30 per cent of the height allows mine officials plenty of latitude for thought and ingenuity. Add to this a tendency for the ribs to spall to the extent that pillars are weakened; that is the mining problem of those in charge of the Flat Top and Bessie mines of the Sloss-Sheffield Steel & Iron Co.

At these mines, which are fifteen to twenty miles from Birmingham, the Mary Lee seam, also known as the Big Seam, runs from 9 to 11 ft. in thickness and lies on a pitch of about 2 deg. Approximately 40 in. from the bottom there is a rock "middle man" from 14 to 29 in. thick. The coal above it is split with a smaller parting locally called the "boy rock," which is 1½ to 15 in. thick.

Spalling of the ribs is the most rapid in the Flat Top mine. Slabs of coal from an inch up to several inches in thickness split off of the ribs on both the butts and faces. Places driven at 45 deg. to the face cleats act in the same way.

Roof weight, slacking of the limestone partings and the effects of the heavy charges of explosives necessary to break the "middle man" are the causes commonly advanced as explaining the trouble. Because the spalling takes place regardless of the size of pillar, and the slabs do not break off in the manner usually indicative of weight, the first explanation does not satisfy.

In Bessie mine the spalling was less frequent after sprinkling of the heading ribs was stopped in favor of rock-dusting. But inasmuch as the change was slight, the slacking theory was discarded. That blasting of the "middle man" is the cause seemed the most plausible explanation, therefore in a section of Flat Top an extensive experiment in driving headings with conveyors has been tried.

For some years Flat Top was worked with 40-ft. rooms on 80-ft. centers. The spalling weakened the pillars to such an extent that a squeeze took place. The cover was from 275 to 550 ft. Now the mine is worked with 40-ft. rooms on 90-ft. centers, and the cover is 450 to 750 ft.

In the 40-ft. rooms two tracks are used, one along each rib. The space between is practically filled with the rock from the partings. The coal is undercut and the lower bench brought down by four shots placed in the coal just below the "middle man." This portion of the seam is loaded to the extent that is practical with the reach of an ordinary shovel without getting under the overhang.

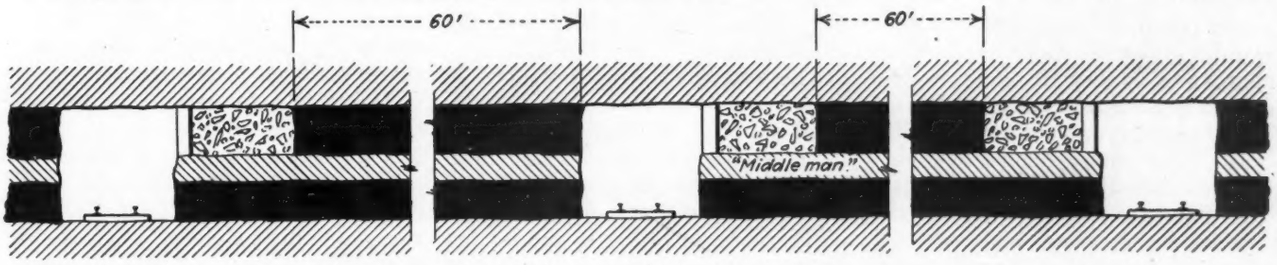
It takes five shots placed just above the "middle man" to bring it down. When this rock drops much of it slides off the tapered pile of coal and out in front of the face. The larger lumps are skidded to the gob by using crowbars.

It is in driving triple headings that the conveyor work has been done with the hope of relieving the pillars from the shattering effect of the "middle man" shots. This conveyor work is illustrated in accompanying sketches.

The method consists of using a Lorain drag flight conveyor, resting on top of the "middle man," to drive the upper bench. After the work has progressed to the extent that the conveyor has been lengthened to 250 ft. the conveyor is removed and the bottom bench worked with mine cars in the ordinary way. After that the conveyor is reinstalled and the cycle repeated.

The upper bench is driven about twice as wide as the lower bench. The latter is driven just wide enough to serve as a haulway, and the former with just enough additional width to provide sufficient space for gobbing the "middle man" and "boy rock."

Sixty-foot chain pillars are left in the upper bench and 72-ft. and 84-ft. pillars, respectively, in the lower bench. In the two outside headings the lower benches are mined along the outside ribs of the conveyor cuts in order to relieve the pillars of the effect of the explosive used in taking up the "middle man."



Triple Heading Driven With Conveyors

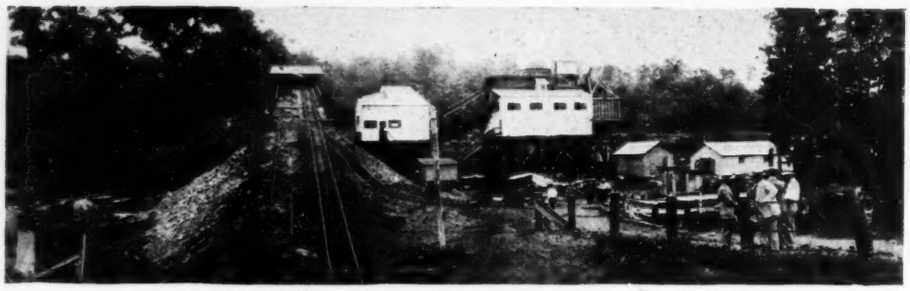
The conveyor is installed so that the discharge end is 40 to 50 ft. back from the face of the lower bench. This allows backing a trip of four or five cars under the conveyor and loading them without uncoupling. The cars are 42-in. gage and hold about two tons.

To obtain stronger pillars the "middle man" is not taken up in most of the crosscuts. This practice, and the conveyor work, results in one row

(Turn to page 625)

LOOKS TO MODERN TOP WORKS

To Promote Profitable Coal Sales



By Willard C. Adams
Allen & Garcia

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BELIEVING in the advantage of a clean, well-sized product both as an aid to sales volume and net return, the Cane Creek Coal Co., an operating unit of the Consolidated Coal Co., has installed and put in service a modern tipple and washery at the Bankhead mine, four miles from Jasper, Walker County, Ala. Five primary sizes of coal—which comes from the Mary Lee seam—are made and cleaned in this plant: 6-in. natural lump, 6x0-in. crushed lump, 6x3-in. egg, 3x1½-in. nut and 1½x0-in. steam. Provision is made for remixing the above grades to obtain the various sizes ordinarily demanded by the market.

The coal is delivered from the mine workings over a double-track slope approximately 800 ft. long to two five-car Ramsay rotary dumps located on a steel structure, one on each slope track. The rotary dumps discharge the coal directly into a 150-ton bin. This slope structure is a part of the original sizing plant and was not adaptable, because of height, to the new screening capacity desired.

As a method requiring the least expenditure and also avoiding possible interruption in mine operation, the new dry sizing plant was built alongside of the existing slope structure. A double beaded pan conveyor having a capacity of 350 tons per hour at a speed of 70 ft. per minute takes the coal from the bottom of the bin in the slope dump structure to the head of the main screens. This conveyor acts as its own feeder, the depth of the coal feed being controlled by levelers consisting of a row of swinging weights mounted on a single shaft which is adjustable as to height. A uniform bed is maintained without hindering the passage of large lumps, thereby eliminating any possibility of wedging.

This conveyor delivers the coal through a curved chute to the shaker screens in the sizing and picking unit of the plant. The screens are of the Allen & Garcia pendulum-hung type, 6 ft. wide and made in two sections each 25 ft. long. The sections are operated in balance by an Allen & Garcia overhead crank drive. Texrope drive is used between the 20-hp. driving motor and the crankshaft.

The screens span the three loading tracks and make four sizes of coal: 1½x0 in., 3x1½ in., 6x3 in. and 6 in. lump. The first two sizes, which normally are washed, are delivered to a bifurcated drag conveyor which is the raw coal feeder to the washer bins. Provision also is made to load either size, or both mixed, direct to cars on the No. 1 track. Either or both of these sizes can be bypassed to a mixing conveyor for loading dry with the larger sizes, as may be desired.

The 6x3-in. egg and 6-in. lump are delivered to separate Lehigh Valley type shaking picking tables. These tables are 5 ft. wide and 20 ft. long and have the advantage of thoroughly spreading the coal and permitting the impurities to be guided off by hand rather than to be individually picked up, as with the conveyor type picking table. The pickings are divided into two grades, pure rock or bone and rock or bone with coal attached. These two classes are delivered by the picker to different drag conveyors for distribution—the pure bone and rock for delivery with the washer refuse to the refuse bin, the bony coal to a single-roll crusher set for a ¾-in. product. This crushed bony coal is delivered to the main feeder and eventually to the washer.

The egg and lump loading booms are located over No. 2 and No. 3 tracks, respectively, and receive the coal from their respective picking tables for loading into cars. The egg loading boom also is arranged to receive nut and steam sizes, mixed or separate and either washed or mine-run. On No. 2 track, therefore, there can be loaded 6x3-in. egg, 6x1½-in. mixed, 6x0-in. mixed or 6x3-in. x 1½-in. x 0-in. mixed. This loading boom also may be raised to deliver any of the above sizes via a chute to the No. 3 track, there to mix with either the 6-in. lump or the 6-in. crushed lump. The lump loading boom in addition to loading lump direct to cars can be raised to deliver to a single-roll crusher set to make 6x0-in. product.

The 1½x0 in. coal and the 3x½-in. coal are delivered by the raw-coal conveyor to separate feed bins in the washer structure. The feed to the washing units is controlled by star feeders preceded by a hand-operated regulating gate.

Four single-compartment type 600 A Elmore jigs are installed and the plant layout provides for a fifth to take care of a mine-run capacity of 2,500 tons. These are set on a

reinforced concrete structure over the No. 1 track. The bins are constructed of steel and timber and are located immediately over the jigs. The nut-coal jigs deliver the washed coal to stationary dewatering screens and the product is loaded direct to cars on the No. 1 track. This method reduces degradation by avoiding bin breakage.

The water from the nut coal is laundered, together with the washed coal from the 1½x0-in. coal jigs to an elevator boot. From this boot the coal is taken to a bin over the No. 2 track by a dewatering elevator. In order to minimize as much as possible the water disturbance in the elevator boot, a part of the water is bypassed direct to the pump well. This bypassed water is taken from the launder through wedge wire screen units having ¼-mm. mesh.

To provide mixing facilities for washed and hand-picked coal, a drag conveyor extends through the washer and screening plants. This conveyor receives on the upper flight washed steam coal direct from the dewatering elevator and washed nut from the dewatering screens, either separately or together. The conveyor discharges onto the nut loading boom for distribution as described above. Provision also is made for loading from the conveyor the 3x1½-in. and 1½x0-in. mixed on the No. 2 track at the washery.

The lower flight of the mixing conveyor is utilized to carry the rock from the picking tables and the jig refuse as delivered by the dewatering elevators to the refuse-bin conveyor. For refuse disposal an automatic side-gate car is used, operated by a single-friction drum hoist. The disposal tracks are set at about 18 per cent grade.

For driving the equipment "cross-line start" squirrel-cage motors are used throughout. The motors in the screening plant are 220 volt and the motors in the washery are 2,200 volt. Centralized control is used for both screening plant and washery. The control for the screening plant is push button with oil-immersed "cross-line starters." For the washery oil circuit breakers centrally grouped are used.

Conveyors Aid in Obtaining Stronger Pillars

(Continued from page 623)

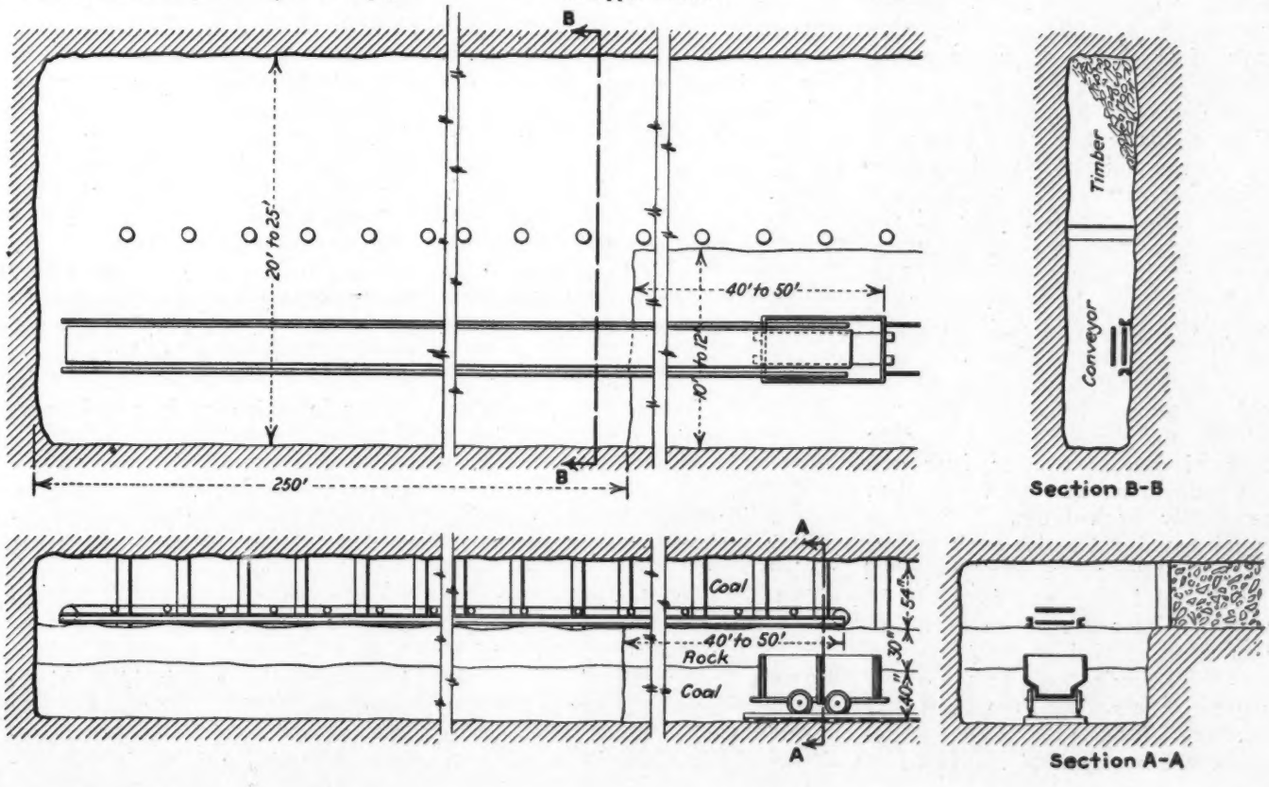
of pillars being free of the shattering effect of the "middle-man" explosive on all four sides and the other row being free except for one side.

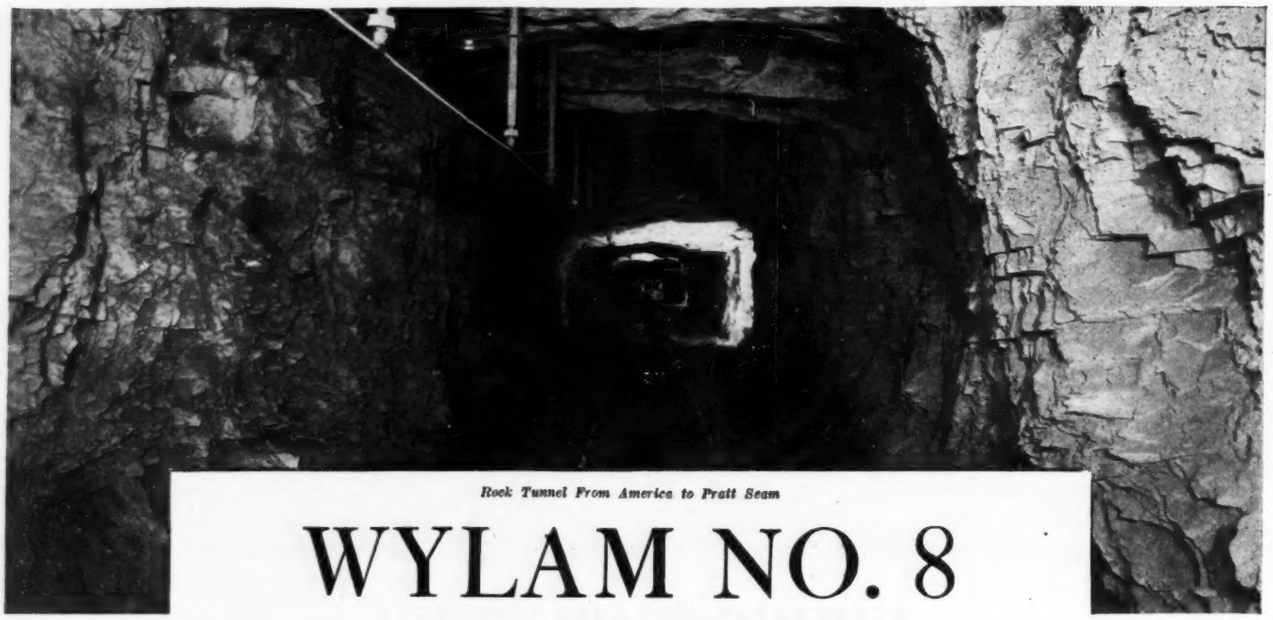
Three 250-ft. conveyors have been used in the heading work. Results to date indicate that very little spalling of the pillar ribs will take place.

It is the intention to work long faces on retreat with conveyors in Flat Top as soon as a section is developed to the property line. The rock in the seam, if gobbed to a fairly uniform height back of the face, will fill from 6 to 7 ft. of the 10-ft. space. This filling probably will simplify the handling of the roof.

In addition to the three long units, conveyor equipment at Flat Top includes five portable belt conveyors. Three of these are Lorain, and two are a special design built for the coal company by the Conveying Weigher Co. These are being tried in rooms and in connection with the long conveyors for speeding development work.

Driving a Heading With Conveyor in Upper Bench





Rock Tunnel From America to Pratt Seam

WYLAM NO. 8

Delivers Its Coal by Belt

By W. A. Hamilton

Assistant General Superintendent, Coal Mines
Tennessee Coal, Iron & Railroad Co.
Birmingham, Ala.

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WYLAM No. 8 mine of the Tennessee Coal, Iron & Railroad Co. has many unusual features. The coal comes to the surface on a series of belts of an aggregate length of almost half a mile. Its system of signaling is unusual. Special care is taken also to provide for adequate bonding of the mine rails. Its rock-dusting practice also is worthy of note.

The mine is located in Jefferson County, Alabama, about a mile west of Wylam, and was opened up about thirty-five years ago. A slope was driven down the full pitch of the Pratt seam from the outcrop, cutting two faults in the first half mile. The coal area thus developed was then practically exhausted and the lower end of the slope abandoned.

A new slope was turned off the old one some distance back from the bottom and driven through another area of coal to another fault and stopped. This new area was then practically worked out. Some few years ago the America seam underlying the Pratt coal was prospected by diamond drill and found to be workable over the entire area. It was then decided to open up the America seam in two places, to drive a tunnel to an area of the Pratt coal in front of the main slope and remodel the haulage and roadways.

The old entries and slopes were low and narrow with poor track, both mule and locomotive haulage being used. It was decided, therefore, to install a belt conveyor and main slope so as to eliminate the expense of the wrecks caused by breaking of couplings and ropes and to reduce the power cost by using electricity instead of steam then generated at an obsolete boiler plant. All the improvements have been made and the mine is now producing 2,500 tons per day at a greatly reduced cost.

The mine is worked by rooms and pillars on the panel system. Main and panel entry headings are driven 10 ft. wide with a 20-ft. airway on each side, 35-ft. entry pillars and 100-ft. side pillars being provided.

Both main-entry and panel-entry roadways are brought as far as possible to even grades and either roof or bottom taken to make the height 6 ft. above the rail. The roof or bottom taken is gobbed in crosscuts and rock eyes. Room-entry headings are driven 20 to 25 ft. wide with an airway of the same width and an entry pillar of 30 ft. Roof is taken so that the height is 5 ft. 2 in. above the rail. This rock is gobbed in the entry.

Rooms in the Pratt seam are 35 ft. wide with 40-ft.. pillars and in the America seam 35 ft. wide with 45-ft. pillars. All rooms are driven for a distance of 250 ft. The extraction of pillars always is started at the inside end of the room entry, retreating back to the panel entry.

In all rooms two tracks are laid, one close to each rib. Crosscuts between rooms are driven every 60 ft., and where gas is encountered line brattices are carried from the last crosscut to the face of the room. Block curtains are placed on the entry to conduct the air through the rooms. The props in these places invariably are set at not less than 4-ft. centers in both directions and so as to be not over 4 ft. from the face.

The coal is undercut by shortwall mining machines to a depth of 5 ft. and blasted down by permissible explosives, the maximum load being two sticks per charge. Miners push the cars between the entry and the face of the room.

The main entrance was originally a double-track slope 5 ft. high, 14 ft. wide and 2,200 ft. long. This was widened to 20 ft. and height increased to 7 ft.; a reinforced con-

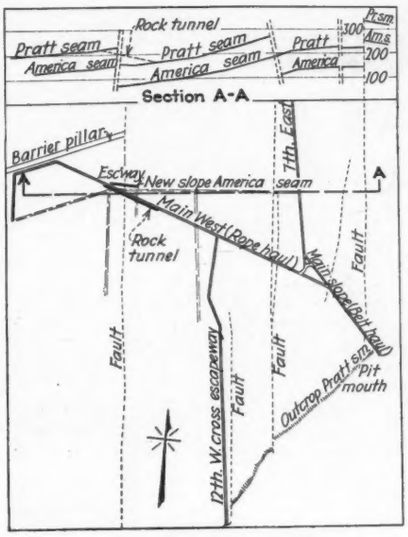
crete wall was built in the center, and over the beltway were placed 10-in. I-beams on 6-ft. centers with I-beam legs. In the beltway was installed a 42-in. belt conveyor in three sections each driven by a separate drive and all electrically interlocked. The loading and dumping station at the bottom was made in old caved workings. For this reason all places had to be supported by reinforced-concrete walls and I-beam roof supports.

The total length of belt conveyor is 2,170 ft. with a vertical lift of 424 ft. and a maximum grade of 36.5 per cent. The normal capacity of the installation is 250 tons per hour. Material is taken into the mine through the other compartment in the slope, which is laid with 60-lb. track, a 2,300-volt a.c. hoist being used for the purpose. The mine cars have a capacity of 1½ tons.

The locomotives haul the loaded cars past the dump and back them down toward it, at which point they are handled by a car haul. The dump is of single-car rotary type and has a capacity of six cars per minute. On falling into a weigh hopper, the coal is weighed and dropped into a bin from which it is fed onto a belt. The weigh scale is equipped with Streeter-Amet recording apparatus and the hoppers are opened and closed by compressed air. The mine cars are transported to and from the working places by 8-ton locomotives, the speed under full load being 8 miles per hour.

In the Main West section of the mine the cars are delivered to an endless-rope side track and hauled up to the landing by an electric endless-rope hoist, which is driven by a 150-hp. 2,300-volt a.c. motor, the length of the haul being 3,500 ft. and the number of 12-car trips made daily being 60 to 70.

In the 7th East section the locomotives deliver the cars direct to the dump. All locomotives have two trolley poles and can be controlled at either end. Block signals operated



Escapeways and Main Roadways With Fault System

by the trolley pole indicate to the motorman by either amber, green or red lights where the other motors are and when the track is clear. A repair room of reinforced concrete with I-beam roof supports has been constructed. A locomotive pit centrally located in this room is equipped with overhead trolley hoists so that repairs to locomotives and mining machines can be readily made. All haulage locomotives are under direction of a traffic man who regulates the movement of trips throughout the mine by telephone.

An 8 x 3½-ft. double-inlet fan exhausting 90,000 cu.ft. of air per minute at 3.2 in. water gage ventilates the mine. A separate split is provided for each panel entry, with a reinforced concrete overcast in each instance. All stoppings are built with rock and are plastered on both sides with a mixture of clay and cement. Doors in room entries are built in duplicate and made self-closing. Line brattices are carried from the last open crosscut to the faces of all entries.

Samples of the air and measurements of the volume traveling are taken every two weeks at various parts of the mine, so as to determine the percentage of gas and the volume. The engineering department measures monthly in all entries the volume of air passing at the last open crosscuts. The humidity and temperature are taken at the same time.

All trolley wire is placed 8 in. outside the rail and in all room entries it is shielded and is placed on the side of the entry opposite that from which the rooms are turned. It is fully shielded at all side tracks and around turnout curves. Feed cables for 250-volt current are carried on porcelain insulators suspended from the roof close to the rib and are protected at all crossings or entries.

The return for d.c. power is through the track and where both rails are used, both rails are connected with two 4/0 bonds. Where the track is of 40-lb. section each rail is connected with but one such bond. Electric light, signal blocks and telephone lines are rubber-covered and carried on porcelain insulators attached to the roof. Rope-haulage roads and slope tracks have signal lines composed of $2\frac{6}{10}$ in. galvanized messenger wires carried on trolley hangers and clamps.

All main-haulage roads are laid with 60-lb. rail and tie plates on 6 in. x 8 in. x 5½ ft. creosoted ties set at 24 in. centers. Entry switches are laid with No. 4 frogs and curves to a radius of 96 ft.

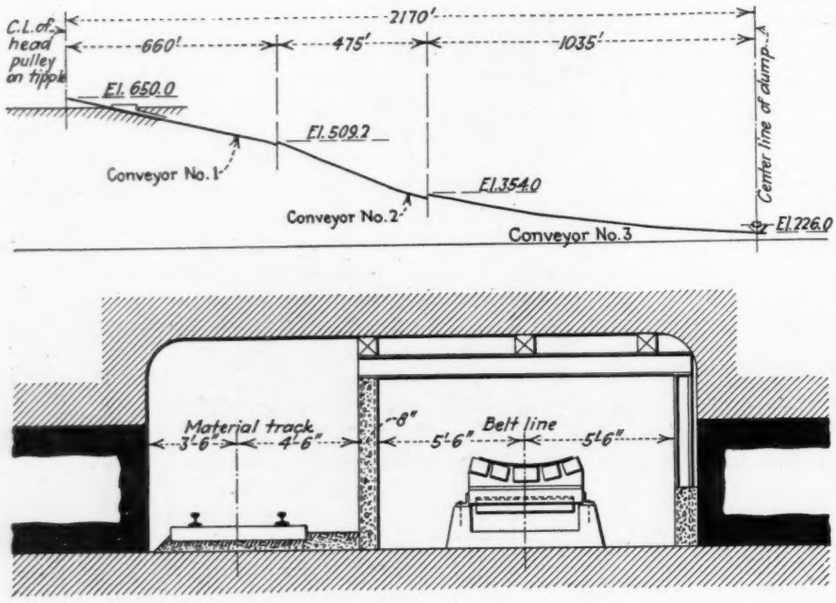
Room-entry tracks are of 40-lb. rail resting on pine ties and equipped with No. 2 switches. Room tracks are laid with 16-lb. rail. As stated, each rail on 60-lb. track is bonded with two 4/0 concealed bonds. One of these is 10½ in. long and the other 25 in., one being on one side of the rail and one on the other and both passing under the fishplate.

On 40-lb. track each rail is bonded with one 4/0 exposed bond. Main-line haulage track is laid to the grades and lines set by the engineering department. No timber or wall must be set less than 2 ft. from the rail, and all entries must be ditched on the trolley-wire side.

All the water in the mine is either removed by gathering pumps or ditched to one main sump at the lower end of the Main West slope, where it is pumped to the surface through an escapeway. The main pump is a 3-stage 1,500-hp. centrifugal unit, direct-connected to a 300-hp. 2,300-volt 1,200-r.p.m. a.c. motor with a total lift of 465 ft. through a 14-in. cast-iron discharge pipe.

All the main-haulage entries are

Where Locomotives Are Repaired



Profile of Conveyor System and Cross-Section of Main Slope

rock-dusted every two weeks in the summer time and oftener in the winter, the necessity for such applications being determined by the analyses of samples which are taken from two to four times per month. If they do not show 65 per cent of inert material, the entry is immediately recoated with dust.

All entries and rooms are laid with spray lines and all rooms and room entries and the inside end of main-haulage roads are washed down daily with water. Pillar coal after being broken down is sprayed before being loaded. All mining machines are equipped with hose and pipe in the cutter bar so that water is carried to the front end of the bar and wets the cuttings. The quantity of water used per foot of undercut is from 2 to 3½ gallons. The cuttings contain from 10 to 15 per cent of moisture.

In grading entries and erecting overcasts all rock is drilled with jack-hammers run by compressed air which is furnished by semi-portable 10x10-in. air compressors belt-driven by motors. For drilling trolley holes and performing other small jobs where one hammer will do the work a small portable gear-driven compressor is used.

All machines are of the shortwall type, making a 5-ft. undercut. Where roof conditions are favorable pillar coal is undercut by machines.

At the belt-loading station equipment is installed to handle from 20 to 25 cars per shift over a picking belt. The slate is picked out of the coal and measured, and the loader of each car is docked according to the quantity of slate obtained.

A manway is provided that is separated by pillars from the main slope and beltway. It is so arranged that the men do not come near the bottom dumping station. Three escapeways to the surface at different parts of the mine have been driven and in addition there is a connection to Edgewater mine which can be used for that purpose. Escapeways also have been driven from the America seam up into the Pratt. These are driven in rock on a 30-deg. pitch.

The mine is divided in sections, each of which is under the charge of a section foreman who is required to have a certificate and who goes to work and quits at the same time as the workmen. These section foremen supervise not only the timbering and safety of the places but the track and rock work also. In fact they superintend everything in their section and are held responsible for its working condition. Two assistant mine foremen are provided, who inspect all sections, supervise the ventilation and have repairs made to main-line haulage tracks, doors, etc. A mine foreman is in general charge of all the inside employees.

The assistant superintendent has authority over the entire working force and sees that dangerous places are given careful attention, that all airways are inspected regularly, that supplies such as timbers, rails, ties, etc., are being provided and that curtains are being used when necessary.

The superintendent is in charge of the entire operation inside and out and through his assistants and underforemen keeps the mine and all machinery in a good safe workable condition so as to produce the maximum output at a minimum cost.

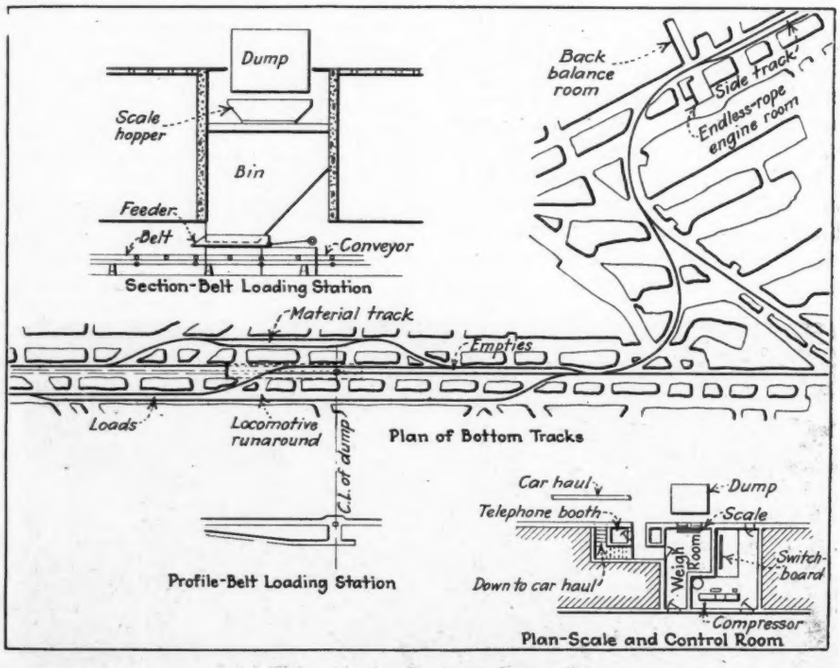
The division electrician with his working force attends to all the electrical repairs on locomotives and mining machines, hangs all trolley wire and bonds all tracks.

In addition to the above there are other men who make periodical visits to the mine.

The superintendent of ventilation examines all stoppings and doors for leaks, traces the air current to see if it is traveling according to the plan of ventilation as furnished to the superintendent, checks the location

(*Turn to page 638*)

Bottom of Belt Slope



Dust Control and Thorough Ventilation Get First Attention

Evidence of Thorough Drenching

"WE DON'T sprinkle—you know I object to that word—we drench when we use water," said Howard J. Thomas, general superintendent of mines of the Sloss-Sheffield Steel & Iron Co., when discussing general safety practices in the mines of his charge. As is the case in a number of Alabama coal mines, he has to contend with considerable gas and with a condition which if not controlled would result in dangerous accumulations of coal dust.

Although much water is used in washing down and wetting coal dust, a large quantity of rock dust also is applied. Main haulways and headings are rock-dusted as often as samples, taken at three-month intervals, indicate is necessary. Rooms are not rock-dusted while active but are thus treated before the track is taken up after completion. Rock-dust barriers of the trough type are used to a limited extent.

Dependence is not placed on rock dust to keep the bottom dirt at a safe percentage of incombustible. Instead the bottom is drenched with a hose as often as is necessary to keep it sopping wet.

Coal dust is combated at its principal source by using water on the cutter bars of mining machines. Each machine is equipped with a pipe which shoots water against the ingoing side of the cutter chain. This practice is followed religiously at the Bessie and Flat Top mines, but deviations are allowed at the Lewisburg mine because it is naturally very wet in places.

All loaded cars are sprayed at the heading turnouts and main yards, and the empty cars wetted as they enter the mine. The water made by the mine is not depended upon as the supply for cutter bars and sprinkling. Instead the inside piping system is connected to the outside water mains and consequently at many points carries over 200 lb. pressure.

Before the initial coating of rock dust is applied to a section the ribs, roof and gob are washed down with this high pressure spray and the accumulation on the bottom is then loaded in mine cars and sent to the surface.

Rock-dusting of narrow work is kept to within 300 ft. of the face. The sprinkling crews wet these areas once or twice per day, depending upon local conditions. Closed lights are used only at the Bessie mine.

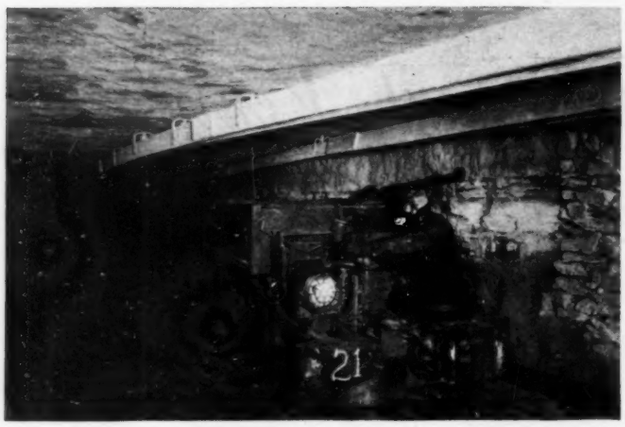
A safety inspector is employed at each mine. He reports to the assistant general superintendent of mines and to the general superintendent of mines on all matters pertaining to safety.

Ventilation is kept continually in a position of first respect at the Sloss-Sheffield coal mines. In addition to insuring by auxiliary power that the main air current will not fail, special precautions are taken to insure sectional ventilation against the possibility of open doors.

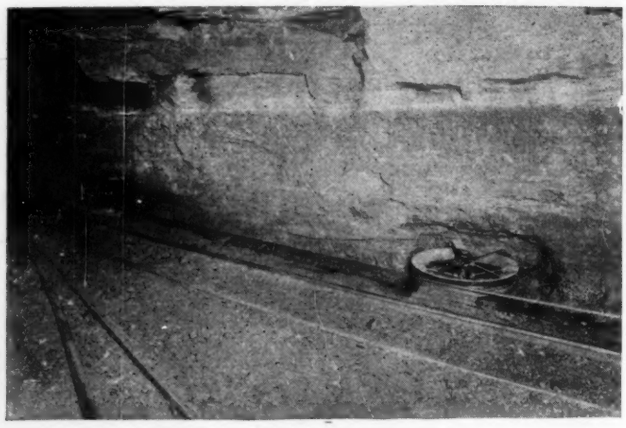
At the Bessie mine, door runners are employed to inspect doors between 3 p.m. and 9 a.m. This requires two nine-hour shifts per day. At midnight one door runner goes off duty and another comes on. The runner gets to all doors two times during his shift, and to some more often. He marks on the door with chalk the time of each visit.

Further precaution at this mine consists of using the airlock system, the two doors being located the length of a trip apart. In some cases a third door is installed and kept blocked open for emergency duty.

A "take-no-chance" procedure is followed in case a fan is to be stopped for repairs on a Sunday or holiday. First of all the power is cut off from the inside of the mine. Next the fireboss or assistant foreman gets an "O.K." from the electrician that all power is off. Third, the fireboss or assistant foreman makes an inspection of the mine to see that it is free of fire and gas. Fourth, they report their findings to the superintendent, and if everything is clear he orders the fan stopped for the necessary inspection or repairs. Fifth, the fan is started. Sixth, after 30 to 40 minutes the fireboss or assistant foreman starts to make a second examination of the mine. Seventh, when the superintendent receives word that the mine is clear of gas he confers



Rock Dust for Safety



Protection Plus

with the electrician to restore power to the inside circuits. To make certain that it will not happen that a fireboss will fail to make his regular examination each must report to the fan attendant just before entering the mine. In case a fireboss should not report by a certain time the fan attendant notifies the superintendent. This is one of several reasons why attendants have not been dispensed with at the fans. In marking up places inspected, the firebosses use one color of chalk and the section foremen another, usually red and white.

Permissible explosive is used in all of the mines. Shooting is not confined to the night shift but is done at any time. In the Bessie mine the shots are fired by electricity furnished from pocket blasting generators.

To avoid or at least to reduce the outbursts of gas when taking down the "boy" rock and top coal in rooms it is the practice in the Bessie mine to drill two small holes in the roof in aircourses and headings at points slightly outby the last open crosscut. The holes are drilled straight up to a length sufficient to penetrate the "boy" rock and the top coal above. The diameter is the same as used for shotholes. The rooms are driven to the limit in the bottom coal and the top coal is then taken. This practice of relieving the gas pressure in the top coal has been followed for the last seven years. Another precaution is to bring down the top coal only at night, when but few men are in the mine.

Safer Ventilation at Lower Operating Cost

(Continued from page 619)

and is operated in either direction by a hand windlass located in one of the motor rooms.

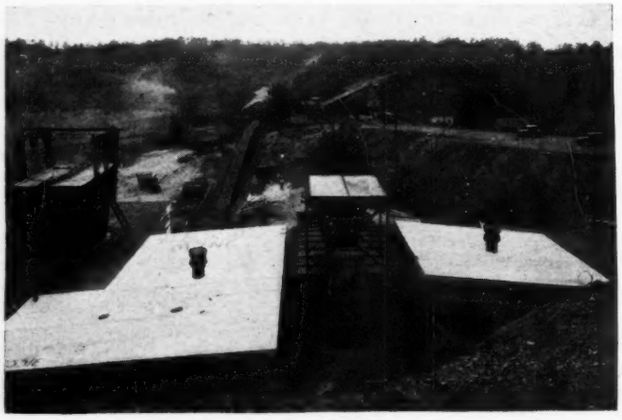
In the room containing the 250-hp. auxiliary motor there is a Sterling six-cylinder, 350-hp. at 1,200 r.p.m. gasoline engine directly connected to a 187-kva. 2,300-volt 60-cycle three-phase generator. This engine is equipped with quadruple ignition, two starting motors, an oil filter, two gasoline filters, and with power and hand gasoline pumps. No features which could add to the reliability of starting and running were omitted.

The fan casing is of steel and the motor rooms of brick with reinforced concrete slab roofs. The brick walls are spaced 6 in. from the fan casing in order to reduce the chance of damage from an explosion.

The governor from an old steam engine is employed to cut power off the mine circuits in case the fan stops. This governor is belted to the fan shaft. When the fan speed decreases to a certain point the governor actuates contacts which open the breakers of all power circuits entering the mine.

A graphic gage of the circular chart type records in inches of water the pressure differential that the fan is generating. This and all other fans of the Sloss-Sheffield company operate on the exhausting system.

Showing Sliding Gate Over Stack; at Left Is the Old Steam Fan



In case of a line power failure the gasoline engine generating unit is started and the fan operated by the induction motor. When line power is restored the engine is shut down. At the end of such an interruption occurring at any time other than during the day shift the induction motor is shut down and the synchronous motor started. But if the interruption happens during the day shift the induction motor operated from line power is used to run the fan during the remainder of that shift. This is to avoid the slight interruption to ventilation which is necessary when the fan discharge gate is closed to allow pull-in of the synchronous motor.

There always is a man on watch at the fan and he has but one other duty, and that does not take him from the fan and provide an alibi in case of neglect of the equipment. This other duty is to check the firebosses into the mine and phone the superintendent if a fireboss does not show up to make his regular inspection.

Galloway Strip Plant

WORKS

TWO BENCHES—*Will Mine Upper Seam Later*

STRIP MINING plays a very small part in Alabama coal production at the present time. Last year there were only nine pits in operation and four of these were worked in connection with underground developments. Seven of these pits were in Walker County, one in Etowah and another—a two-man operation with an output of 300 tons in 100 days—was in Winston County. Excluding the mines which loaded over the tipples of other operations, these four strip pits had an output of 150,953 tons in 1927.

One of the most recent developments in this type of mining is the plant opened up in November of last year by the Galloway Coal Co. near Townley in Walker County. This plant has a capacity of 650 tons per day and is being operated in connection with the company's No. 15 mine. The acreage to be recovered by steam shovels is estimated to contain between 1,000,000 and 1,250,000 tons of coal. Approximately 450,000 tons of this coal is in two benches of the Jagger seam; the rest lies above that coal in the Mary Lee seam. Present operations are confined to the two benches of the Jagger seam, but ultimately it is planned also to uncover the Mary Lee coal.

The area to be stripped is an irregularly shaped plot with a maximum length of 1¾ miles and a maximum width of ¾ mile. As will be seen from the accompanying sketch, the Jagger coal seam also is being mined through the rock-slope openings of No. 15. These underground workings extend under the Mary Lee coal which is to be stripped after the Jagger coal in the pit has been recovered.

The location and contours of the area now being stripped and its relation to the underground developments are such that there are no outcrops of the Jagger seam in the common understanding of that term. What ordinarily would be outcrops from a strip-development standpoint actually extend into the underground workings. For this reason it was necessary to drive the first box cut through the center of the property to be stripped and handle this box-cut spoil twice.

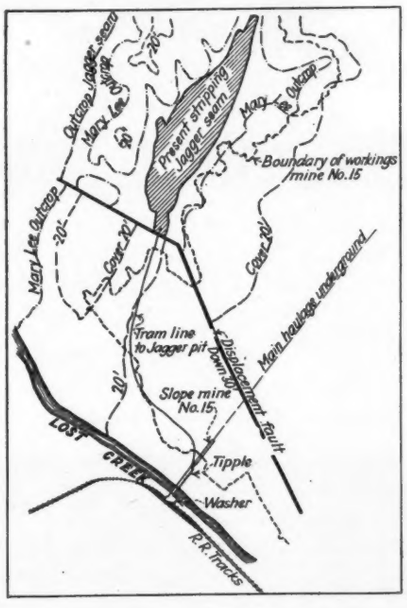
The overburden above the upper bench of the Jagger seam consists of soil and hard shale and ranges from 5 to 35 ft. in thickness. It is being stripped by a type 252 Marion steam shovel with a 3½-yd. dipper and a 75-ft. loading boom having a dumping radius of 83 ft. This shovel is followed by two type 32 Marions with 1½-yd. buckets. One of these smaller shovels loads out the top bench of coal and the parting between the two benches. This parting averages 11 in. in thickness.

The coal is carried out of the pit a distance of 1 mile over 56 lb. rails by 15-ton Porter steam locomotives over a trestle leading to the top works of No. 15. The gage of the track is 40 in. This particular gage track was adopted to conform with the track already in use at No. 15. The coal is dumped into a bin and delivered to a 42-in. x 200 ft. belt conveyor which carries it to the Montgomery washer, where it is screened for size and washed. Domestic sizes are loaded into cars by loading booms.

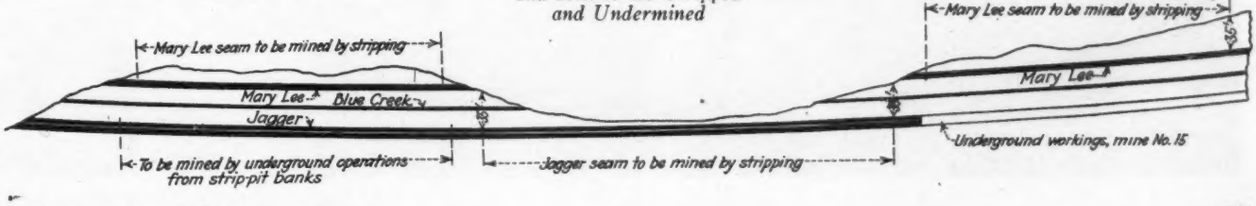
At the time the pit was started shovels and other equipment were unloaded and erected about three-quarters of a mile distant from the point where stripping operations were begun and on the opposite side of Lost Creek, necessitating the transportation of this equipment and the

(Turn to page 642)

Both Mine and Stripping

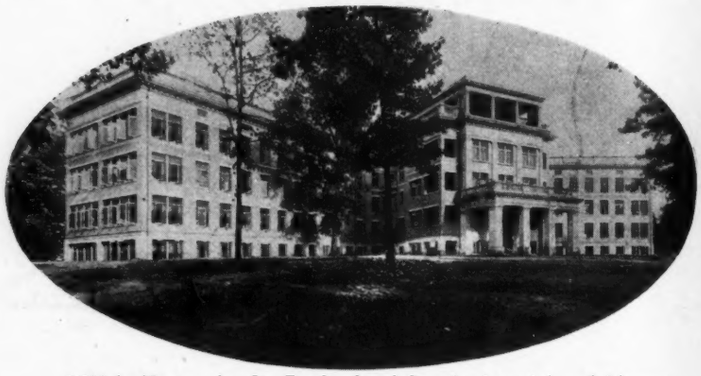


Section Showing Valley Being Stripped and Hill to Be Stripped and Undermined


Mary Lee seam to be mined by stripping
Mary Lee
Blue Creek
Jagger
Mary Lee seam to be mined by stripping
Mary Lee
Underground workings, mine No. 15
To be mined by underground operations from strip-pit banks
Jagger seam to be mined by stripping

At Home in Alabama Mining

Moorish Effect in Water Tower at Marvel.
Roden Coal Co.



Widely Known for Its Professional Standards and for Achievement in the Field of Social Welfare—Employees' Hospital, Tennessee Coal, Iron & Railroad Co.

Negro First-Aid Champions of Alabama Flanked by Superintendent Jones and Their Trainer at Sipsey.
DeBardeleben Coal Corporation

School Children Face Alabama Sunshine at Empire.
DeBardeleben Coal Corporation

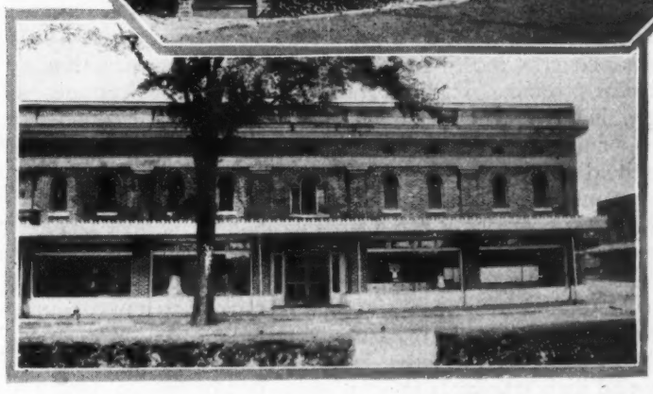
Quiet Charm Evident in These Homes for Nurses. Tennessee Coal, Iron & Railroad Co. Hospital Grounds

Communities

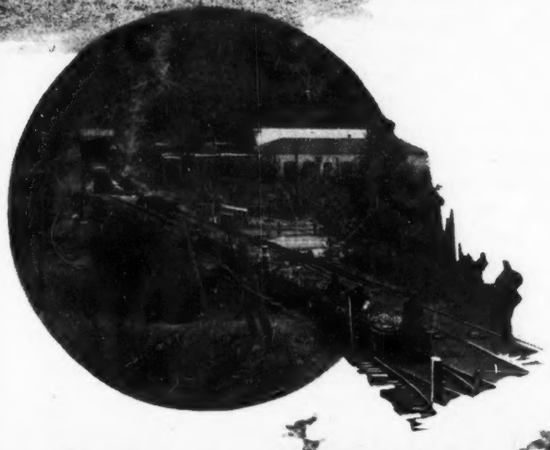
These Sipsey Boy Scouts Own the Cup; Three-time Winners in State First-Aid Contest. DeBardeleben Coal Corporation

Store in the Grove, America, Ala. Stith Coal Co.

Homes in the Shade of Southern Foliage, Acmar. Alabama Fuel & Iron Co.



Convenient for Shopping, Carbon Hill. Galloway Coal Co.

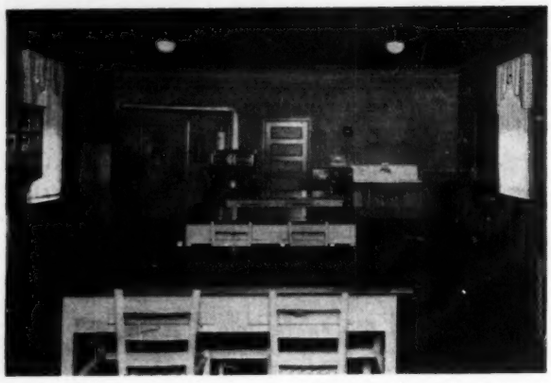


On the Way Out—at Marvel. Roden Coal Co.

Marvel Has Its Broadway. Roden Coal Co.

TEACH DOMESTIC SCIENCE

To Raise Miners' Living Standards



White Domestic Science Kitchen, Dolomite

CLASSES in domestic science in its most practical form have an established place in the school curriculum of the Woodward Iron Co. and are attended by the girls as regularly as other classes. As many of the pupils never attend high school this is the only opportunity they have to receive such training. Consequently practical work which can be adapted to the simplest home is constantly kept in mind, always with the definite purpose of raising the standard of living.

These classes extend through the sixth and the first two years of junior high school. The work in these three grades covers most housekeeping problems, sewing, home cooking, simple home serving, canning, personal and household cleanliness, household furnishing, laundry work, theory only as absolutely necessary for immature students and planning of meals and budgets.

College graduates are engaged as instructors and receive their salary from the company. Care is used in their selection as attractive personality and high standards exert a considerable influence on the pupils. Instructors for colored schools are graduates of good colored schools and experienced in teaching and in practical housekeeping. Three periods of 90 minutes each are devoted to cooking each week and two to sewing.

Physical equipment is dependent upon available space. In several schools adequate space has allowed almost a regular kitchen to be put in. At others a cottage like those of the employees is made into a "model cottage." Cooking is done on coal ranges and the other equipment is similar to that found in the pupil's homes. Small classes of twelve pupils have been found best.

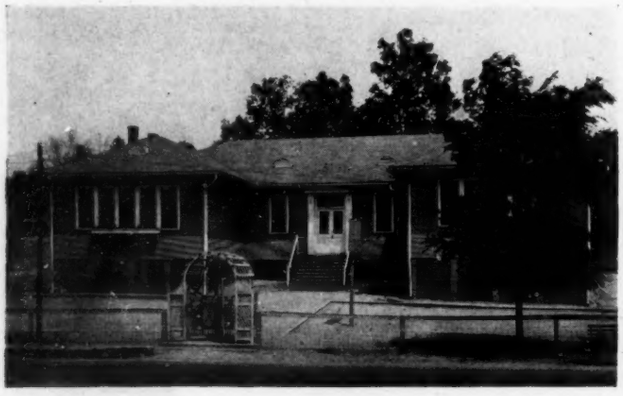
Sufficient quantities of food are cooked to approximate home conditions. A "meal lesson," which is a review of the previous work, is taught once a month, and the problem of cooking and completing several foods at a time is attacked frequently. At times a pupil is assigned one dish to prepare absolutely alone. One lesson a week is devoted to housekeeping, furnishing and personal hygiene.

At schools where lunches are served, the pupils assist, according to the needs, from serving fruits and milk to preparing simple lunches in large quantities. They also are called upon to serve lunches or teas for meetings or "Better Home" demonstrations. One year lunches were served daily to men in the operating department over a period of several weeks.

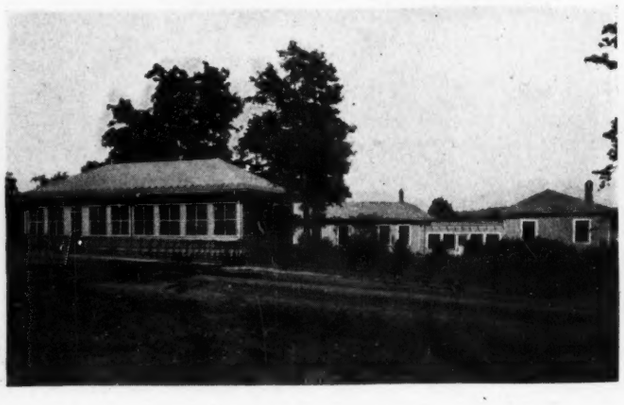
The company furnishes all the staples and supplies for the meals and the pupils pay a fee of 15c. a month for the rest of the regular lessons. During the summer months canning classes are held for the women of the colored communities, who usually are backward in their knowledge of cooking.

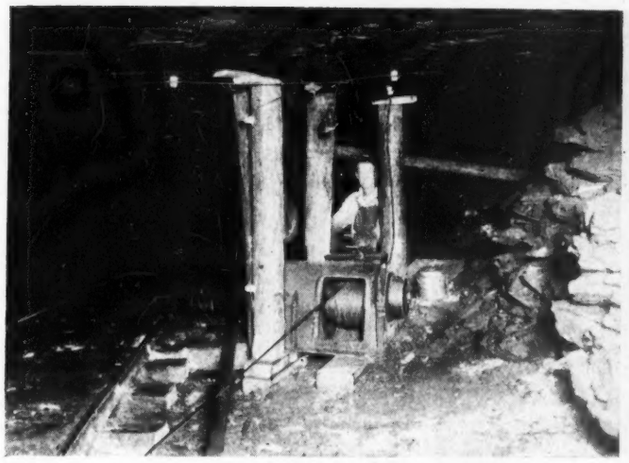
Class work also includes a certain amount of sewing on such articles as curtains, bedding and tea towels. Material for personal sewing is furnished by the pupil who takes the finished garment. At the end of three years a girl has made practically everything that may possibly be needed by an individual or in the home.

Mulga Domestic Science School for White Children

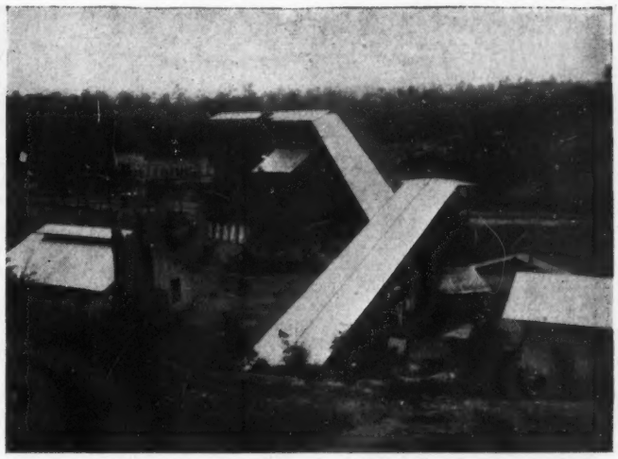


Domestic Science Cottage and School for Colored Girls at Dolomite





Hoist Used Temporarily at Top of a Roll in Main Heading



View From Hill Near Slope Portal

How Samoset Mine

CUTS PRODUCTION COSTS

DROP-BOTTOM mine cars, a belt conveyor on the slope, and belts used around the washer wherever possible, even for disposing of refuse, are some of the interesting features of the new Samoset mine of the Pratt Fuel Corporation.

This mine, one of eight operated by the corporation, which in 1927 produced over a million tons from its properties, is located in the Warrior field about three miles from Dora, Ala. It was opened June 1 of this year. The equipment is designed for an ultimate production of 2,500 tons per day but at present 500 tons, all development coal, is being produced.

The mining is in the Mary Lee seam, which in this locality runs from 48 to 96 in. in thickness and averages about 67 in. The rock parting, commonly termed the "middleman," averages 5 to 6 in.

Inside equipment already purchased and put into use includes one 6-ton cable reel locomotive driven by two 40-hp. motors, two 5-hp. room hoists, a "low-vein" shortwall mining machine and 25 Sanford-Day drop-bottom cars of 64 cu.ft. capacity.

The tracks in main headings are being laid with 60-lb. steel, and manganese cast frogs are used. The room hoists, which are of the "Brownie" portable type, are utilized temporarily in driving the main headings through local rolls. As the permanent track is laid these rolls are graded for locomotive haulage.

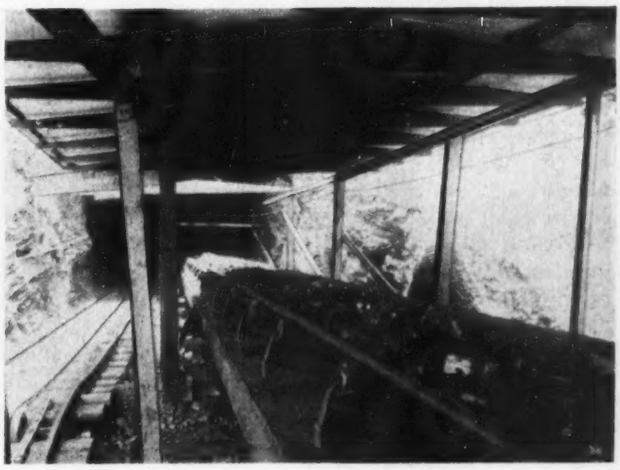
Simplicity, made possible by the use of drop-bottom cars and the belt conveyor, is the outstanding feature of the bottom arrangement. The shallow pit into which the cars dump automatically feeds directly onto the 42-in. belt conveyor that leads up the

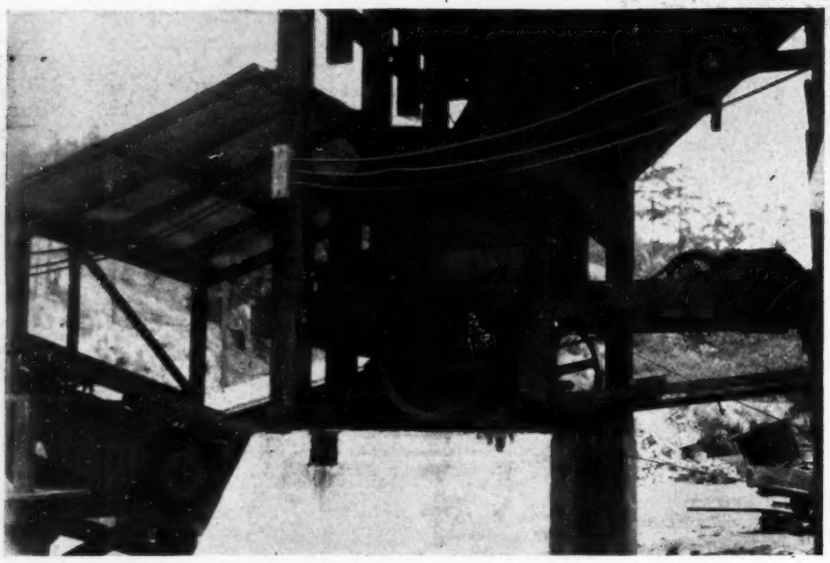
* * *

Trip Dumping at Bottom of Main Slope

* * *

Looking Down Toward Slope Portal





The Crusher Is Near the Ground on a Concrete Foundation

main slope. It is surprising how uniformly the coal loads onto the conveyor without a mechanical feeder. If increased production shows the necessity for a feeder, one will be installed.

The 42-in. main slope conveyor is 202 ft. long between centers. Antifriction idlers fitted for grease-gun lubrication are used on the conveyors.

Because the coal requires washing and the mine output is sold for railroad fuel the slope conveyor dumps directly into a small bin feeding over a reciprocating apron and into a single-roll crusher that is located but a few feet above the ground. Another 42-in. belt, 220 ft. between centers, elevates the coal to a 2½-in. revolving screen located at the top of the washing plant.

* * *

The over 2½-in. size is carried by a third 42-in. belt, which serves as a picking table, to a loading boom, where it is mixed with the washed product.

Washing of the under 2½-in. coal is done without further separation in two jigs of 6-ft. width. The washer refuse is conveyed to a dump by a 16-in. belt 300 ft. long between centers.

The conveyor galleries and washer are wood construction set on concrete footers extending several feet above the ground surface. All of the lumber is hardwood sawed on the company property. The joints were thoroughly leaded when put together and the whole structure was well painted with creosote.

Purchased power is used. The a.c. substation supplying the conveyor motors, washer, fan and material hoist consists of three 75-kva. 2,200/220-volt transformers installed outside. The d.c. substation contains two 100-kw. induction motor-generator sets with hand control.

Getting Down to First Causes at Sipsey

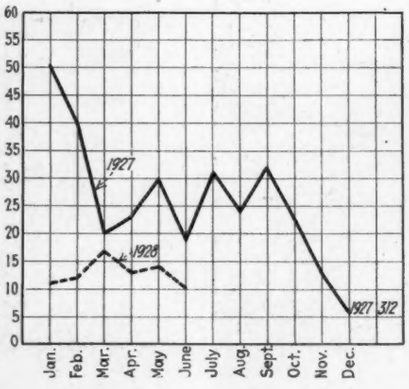
(Continued from page 613)

great depth. When it rains the plateau furnishes them with great volumes of water. Thus the Sipsey River often rises 30 ft. in a few hours. The pumphouse of the Sipsey mine has been placed where the declivity leading to the river is less steep, but in order to be at an elevation that will permit the water to be sucked into the pump it has at low stages to be placed at such a level as would cause it to be flooded at high water. So the pumphouse and its contents are put on an inclined track, and a hoist is provided to pull the pumphouse up the bank as the river rises.

In the effort to have safety enforced the DeBardeleben Coal Co. has decided that cases demanding discipline shall be handled according to a definite plan. Prior to a safety meeting of Sept 28, 1927, the method of discipline was left to the local management at the mines. After that date mine foremen, superintendents and safety inspectors were required to warn any employee on his first violation of a safety rule. When the same rule is violated a second time by the same employee the safety inspector is required to report the offense to the mine foreman or assistant superintedent and one of these officials is required to suspend such employee for a period of five to ten days. For the third violation the mine foreman, safety inspector or assistant superintendent is required to report the offense to the superintendent and the superintendent is required to discharge the employee.

The Badge of a Careful Employee

Accidents Dropped When Discipline Became Mandatory



The results have been startling. The record for safety has greatly improved. For the first six months of this year the number of lost-time accidents was 57.9 per cent of that in the first six months of last year.

When a man accepts a job with the company he is given a button which labels him as a safe man. When he is disciplined this button is taken away.

The company has a ten-bed hospital at Corona, toward which married men contribute $1.25 monthly and single men 75c. It has established a dairy for supplying its workers. This is run as a private venture by a man who is provided with a big barn and house at the same house rent as is charged a miner. Milk collections are made without discount on the company's payrolls. The school authorities providing only six months of schooling, the men and company together contribute enough to keep the schools running another three months. The company's contribution amounts to $10,000 annually.

Jig Washer at Wylam No. 8 *Shows High Efficiency*

By Robert Hamilton

Consulting Engineer, Coal Mining Division
Tennessee Coal, Iron & Railroad Co.
Birmingham, Ala.

◆

EFFICIENCIES of 91.2 per cent for separation and 99.3 per cent for recovery, or a total efficiency of 90.56 per cent has been obtained as an average for a whole year's run at the Wylam No. 8 washer of the Tennessee Coal, Iron & Railroad Co. This plant was erected in 1913 and put in operation early in 1914. After several years' experimenting with the various types of washers then in general use, decision was made in favor of jigs, as being more suitable for the Pratt seam.

In itself this coal is comparatively clean, but as the seam carries two bands of friable slate, the mine-run is more or less contaminated when being loaded into mine cars. Further, the bed carries small layers of bone coal varying from 2 to 4 per cent of the entire seam. This boney material cannot be allowed to remain in the coal intended for coking because it is too high in ash and has other objectionable characteristics. Nevertheless, it is too valuable to be discarded.

It was therefore decided to install 3-cell jigs and make three separations; namely, coking coal with an approximate ash content of 4.5 per cent; boiler coal with an approximate ash content of 15 per cent and refuse with an approximate loss of 0.5 per cent of raw coal.

When operating on Pratt coal exclusively the average results for one year are as shown in Table I.

Table I—Average Results for One Year's Washing, Pratt Coal

Product	Per Cent	Tons	Tons
Raw coal delivered to washer	100.00	.....	220,652
Coking coal	77.92	171,945	.....
Boiler coal	7.81	17,229	.....
Refuse	14.27	31,478	.....

Float in refuse (washer loss) 0.575 per cent of raw coal = 1,290 tons.

Average Analysis for Year

	Volatile Matter, Per Cent	Fixed Carbon, Per Cent	Ash, Per Cent	Sulphur, Per Cent
Raw coal	28.38	56.55	15.09	1.28
Coking coal	31.30	64.10	4.60	1.08
Boiler coal	27.21	60.91	11.88	1.56

Refuse	Per Cent of Refuse	Ash, Per Cent	Sulphur, Per Cent
Float	4.1	3.98	1.13
Sink	95.9	71.02	2.22

The separation of the refuse is made at a specific gravity of 1.37. All coal is crushed to pass through a 1¼-in. round perforation before delivery to washers and no further sizing is necessary.

Average of Screen Tests, Raw Coal

Size	Per Cent of Size	Ash Percentage
Over ½-in.	22.3	11.52
Through ½ and over ¼-in.	8.8	12.88
Through ¼ and over ½-in.	27.9	10.36
Through ½ and over ¼-in.	13.3	11.62
Through ¼ and over $\frac{1}{16}$-in.	13.9	15.57
Through $\frac{1}{16}$-in. and over 40-mesh	9.6	17.92
Through 40-mesh and over 80-mesh	2.3	21.36
Through 80-mesh	1.9	19.17
Average		12.88

Based on an inherent ash of 4.8 per cent:
The washer efficiency is 91.2 per cent for separation
99.3 per cent for recovery

90.56 per cent total efficiency

Based on an inherent ash 4.2 per cent, "coking coal" only:
The washer efficiency is 90.3 per cent for separation
99.3 per cent for recovery

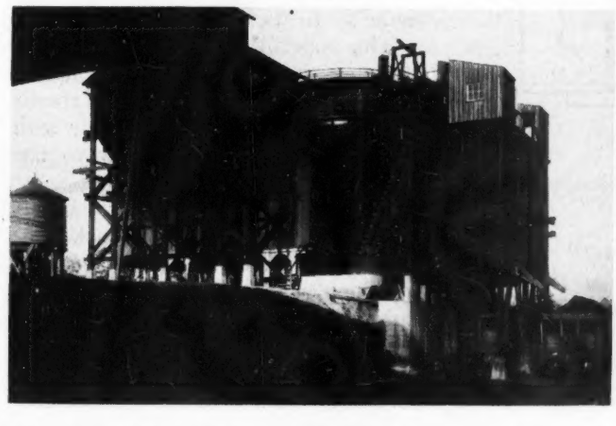
89.67 per cent total efficiency

Attention is called to the high ash content of all sizes under $\frac{1}{16}$-in. A large portion of these fines passes through the jig beds, is drained off through the hutches and deposited in the refuse settling tank; however, owing to the high velocity of the circulation water, much of this is carried over into the large cone sludge tank, where the circulation is partially clarified before being returned to the jigs.

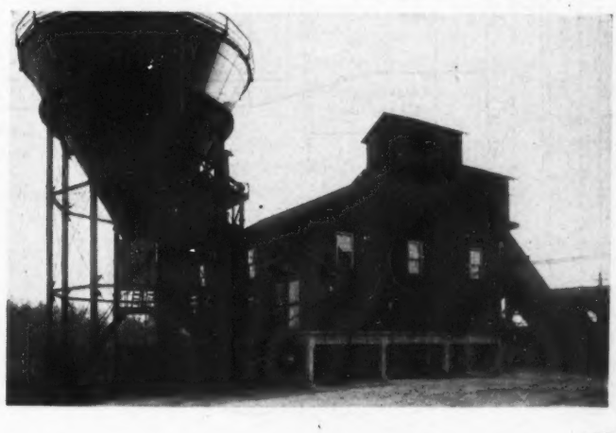
The average ash content of the washed coal as it leaves the jigs is 4.22 per cent, but when the muck coal from the sludge tank is remixed therewith the average ash content is increased to 4.6 per cent. An additional settling tank is being erected to permit partial clarification of the circulation water from the refuse settling tank before it is delivered to the large sludge tank for final classification. The circulating water is operated in a closed circuit; as far as practical, no water is allowed to flow away therefrom.

A concrete track pad is provided at the loading bins of sufficient length to permit a decrease in the moisture of the coal in the railroad cars to approximately 13 per cent, or practically the same quantity of water as is added to keep the circulation water uniform. This water flows by gravity to a sump at the lower end of the track pad, is elevated therefrom by a water elevator and recirculated.

Washery at Wylam No. 8 Mine



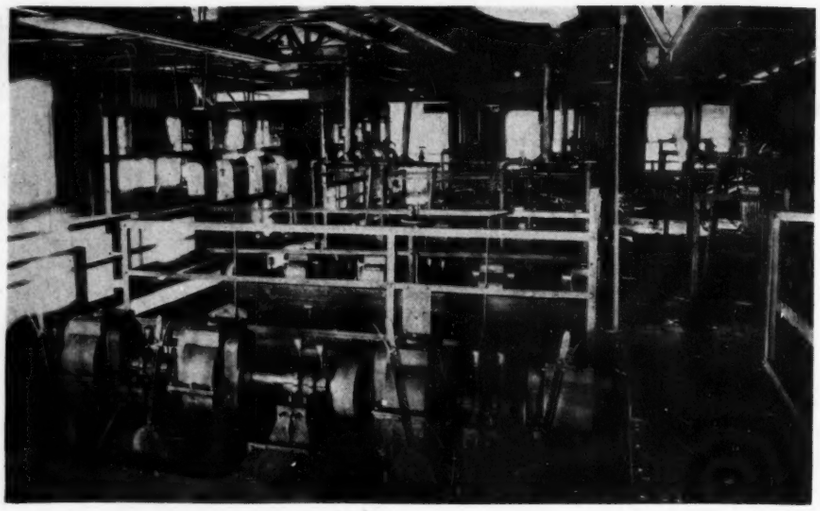
Sludge Cone Tank and Washery



In case of a breakdown of the elevators or jigs when the plant is in full operation a special tank (known as the washout tank) is provided, into which the circulation water can be deflected and held until repairs have been made; thereafter it is returned into circulation by gravity flow. Under normal conditions this tank is kept empty.

When the plant was originally installed the washing equipment consisted of two 3-cell jigs, each with an estimated capacity of 55 tons of washed coal per hour; each cell is 6 ft. square with two plungers of equivalent area on either side and provided with one rotating slate valve and two sliding hutch valves. The slate and hutch refuse from the first and second cells are flumed to the refuse settling tank and elevated therefrom to the slate bin, where they are loaded into railroad cars. The product from the valves of each third cell, also the hutch material therefrom, is combined and flumed to the boiler-coal settling tank and thence to railroad cars.

The overflow from the third cell, carrying the washed coal, was formerly flumed direct to two centrifugal driers which were recently replaced by an ordinary settling tank. Though the coal delivered from the driers



Each Unit, Comprising Jig, Elevator and Pump, Has Its Own Motor

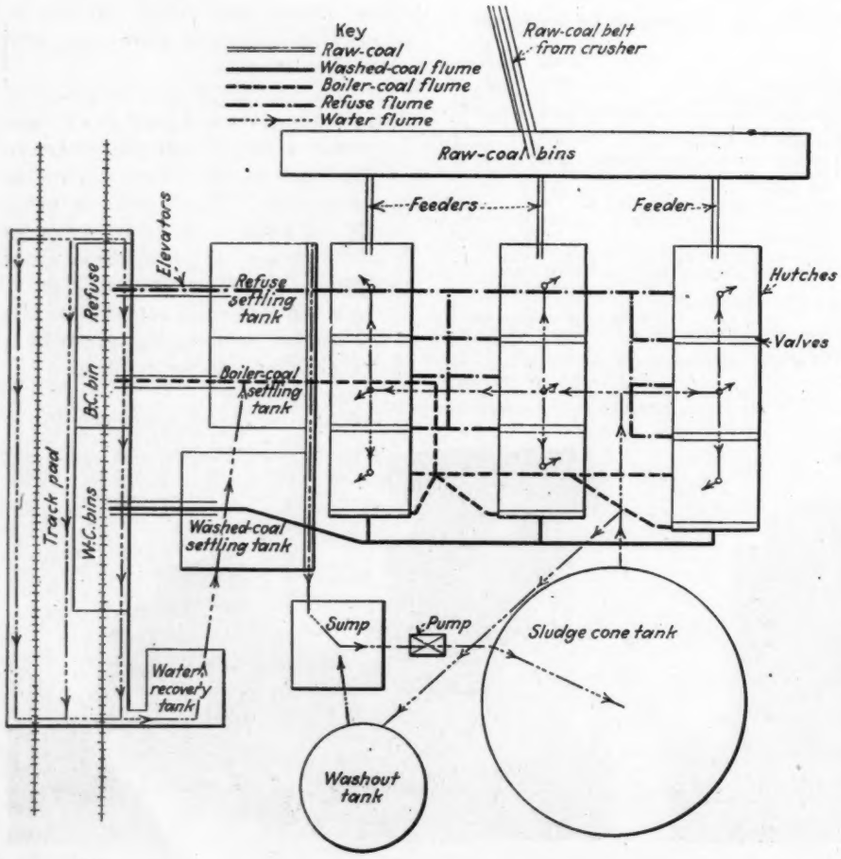
gave satisfaction in that it contained only about 5 per cent of moisture, no satisfactory method could be found to reduce the moisture in the muck coal from the sludge tank. This product carried from 50 to 60 per cent of water and when remixed with the dried coal raised the moisture in the mixture to approximately 12 per cent, which was the same percentage as was obtained from the ordinary settling tank. Thus it was possible, without injury to the product, to eliminate the cost of running the driers.

THE jigs are operated at 120 strokes per minute. In the first cell the length of stroke is $1\frac{1}{4}$ in.; in the second, 1 in.; in the third $\frac{3}{4}$ in.

The raw coal is delivered to the jig by a rotating feeder 66 in. wide covering the whole width of the jig cell.

Formerly it was the practice to load the muck coal directly into railroad cars while they were being loaded from the washed-coal bin. The mixture was not satisfactory, and it is now the practice to mix the muck coal by means of compressed air with the washed coal as it is delivered into the bin by the elevator.

Diagram, Wylam No. 8 Washer



Delivers Its Coal by Belt

(*Continued from page 628*)

and size of regulators and the overall condition of the working places as regards ventilation.

The chief mine inspector examines all places in the mine and all machinery for safety and receives for transmittal to the general superintendent any complaints the men may make as to their working conditions.

The superintendent of the rescue station visits the mine to check up his ventilation map with the actual conditions, so that he will be familiar with them in case it is necessary to use breathing-apparatus crews.

The company when hiring a workman provides him with a book containing the rules and the penalties attaching to their violation. In every instance the new employee is required to give a receipt for the book, thus giving recorded evidence that this important detail has not been overlooked.

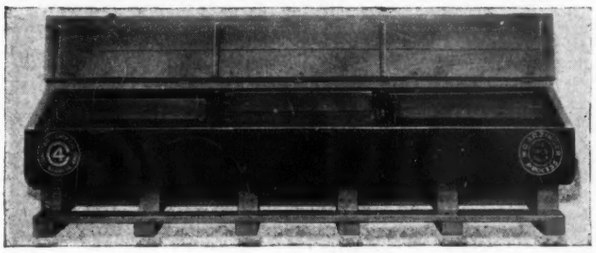
Oil Cleans and Reclaims Coal At New Castle Coal Co. Plant

MANY washeries waste their fine coal, permitting it to run off into the stream and be lost beyond recovery. At the New Castle Coal Co.'s mine, New Castle, Ala., the Arzinger process, which is owned by the Coal, Coke & Chemical Corporation of Birmingham, is being used to recover the overflow from the settling tank. This system cleans coal from ¼ in. down and salvages and reclaims the finest material.

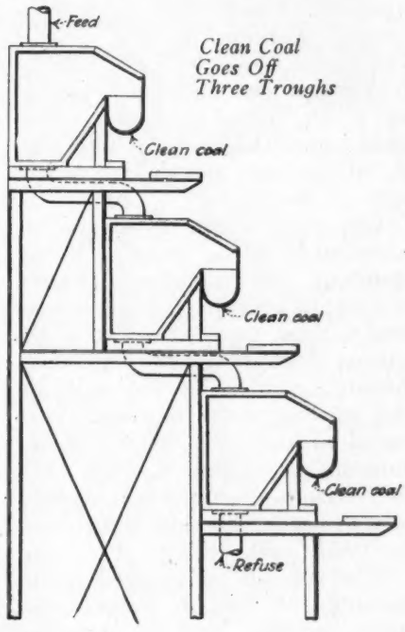
The overflow coal from the New Castle settling tank is caught and piped to the pump, which delivers it to the Arzinger flotation cell. The small quantity of oil needed to form the froth for this cell is admitted to the water through the suction pipe of the pump, the emulsion entering the cell at the top. The fine coal contained in the overflow water is agitated with fresh water through a perforated pipe in the cell.

The fine coal comes to the surface of the water in the froth, where blades wipe it off into a trough at the side. A screw conveyor carries the reclaimed coal to the drying bin. This product, which is the same as the "sea coal" used in iron foundries, contains an unusually low percentage of ash.

Tank for Floating Off Coal on Oil Suds



A similar cell has been installed at the Bessemer plant of the Humphreys Coal & Coke Co., Greensburg, Pa., which is cleaning coal from ¼ in. down. The middlings and rejects of the same sizes from a dry table are delivered to this same cell and cleaned, reducing both sulphur and ash content with a large percentage of coal recovery. The diagram shows the general arrangement of the apparatus in a cleaning plant. The units contain one, two or three cells and the output per unit is about 25 tons of clean coal per hour, depending on conditions.



Climbs Double Fault by Hoist Plane

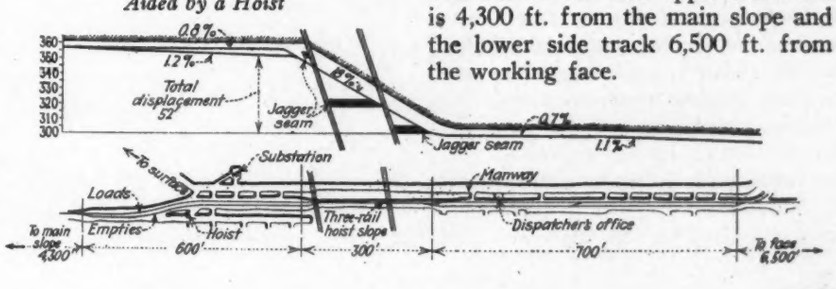
DISPLACEMENT faults in Alabama, as elsewhere, frequently mitigate the misfortune they entail by bringing up or dropping down one seam to an approximate level with another, enabling the operator, temporarily at least, to work or drive his entries in another seam than the one he first decided to mine.

Sometimes the exchange is not so unfavorable as might be feared. The seam wished on him by the convulsion of nature proves itself of value, either for coal extraction or at least for the driving of entries to some point where the fault is either reversed by another or entirely tails out.

Sometimes, however, there is no seam available to supply the gap between the fault and its reverse dislocation, if such exists, and the change in level is such that gradients must be introduced too steep for a locomotive to climb, and then sidetracks and a plane have to be provided, the continuity of transport being broken with much accompanying inconvenience and delay.

At Carbon Hill, Ala., the Galloway Coal Co. is working in a basin about 1¼ miles wide which runs northeast and southwest more or less parallel with the line of the Appalachian uplift. The seam worked is the Jagger, a bed between the Black Creek and the Mary Lee at the foot of the middle beds of the Pottsville series. The basin has an average pitch of about 2 deg. southwest and is broken up by several displacement faults which cross it almost at right angles running in a northwesterly and southeasterly direction, the displacements varying from 10 to 52 ft. Wherever the displacement does not exceed 20 ft. the haulage roads are brought to an average grade of 3½ per cent, so that the cars can be transported by trolley locomotives.

Makes the Fifty-Foot Step Aided by a Hoist



The cross-section and plan show two displacement faults about 180 ft. apart and having a total displacement of 52 ft., necessitating a 300-ft. rock slope on an 18-per cent gradient for the hoisting of the mine cars, the difference in elevation being too great to be rectified by grading. The vertical scale is 3⅓ times that of the horizontal. The displacements are exaggerated therefore; roughly, they are in reality at a 45-deg. angle to the vertical. The hoist is a 75-hp. Ottumwa unit with friction-type drum. In the substation are two 200-kw. 2,200-250 volt synchronous motor-generator sets. Above the fault 600 ft. of side track is provided and below it 700 ft. The upper side track is 4,300 ft. from the main slope and the lower side track 6,500 ft. from the working face.

Leadership in Medical Service

SPEAKING to a group of coal men along the side lines at a first-aid meet in West Virginia recently, a well-known operating man said to a representative of *Coal Age*: "If I ever need medical or surgical attention the one place I want to go is to the T.C.I. hospital in Alabama, and the man I want to see is Dr. Lloyd Noland." Thus spoke a man who has spent a life time in mining communities in various parts of the country.

That this tribute is deserved is borne out by a long record of accomplishment. No account of industrial or social progress in Alabama is complete without some statement of the relation of this hospital to community thinking. Addressing the tenth annual meeting of the American Association of Industrial Physicians and Surgeons in Atlantic City in 1925, Dr. Noland, superintendent, department of health, and chief surgeon for the T.C.I., said, in part:

"The company is engaged in the operation of iron-ore mines, coal mines, quarries, blast furnaces and various plants for the manufacture of steel. These mines and plants are distributed over a wide territory, although most of them are within a 15-mile radius of Birmingham, Ala. The payroll averages about 23,000 men, 57 per cent of whom are negroes and 40 per cent whites, only 3 per cent being foreign born. From 40 to 50 per cent of these employees live in villages owned by the company, which are contiguous to mines and plants. The remainder of the force live in the city of Birmingham or in villages and towns within short distances of the plants in which they are employed.

"Prior to 1913 the sanitation of these villages was, generally speaking, in the hands of the local superintendent, with no supervision by a skilled sanitarian beyond some attention to water supplies. The medical work for the men and their families, as well as the handling of injury cases, was done under the old 'contract' system, the physician being engaged by the local or general superintendent, and receiving a certain amount per man for his work, the collection of this fee being made from the men through the payroll. A number of physicians were employed on this basis and each one was entirely independent of his fellows. Under the usual contract the physician was supposed to furnish the necessary medicine and hospital care at his own expense, and to employ the necessary number of assistants to do the work. The natural consequence of this practice was that usually the work was done as cheaply as possible and consequently unsatisfactorily.

"Early in 1913 the department of health of the company was organized, a superintendent and assistant engaged, and the department put on a basis similar to that of other operating departments of the company. For convenience the department functions in four divisions—sanitary, medical, dental and base hospital.

"The sanitary division, under the direction of a chief sanitary inspector, is responsible for the purity of all water supplies; the care of closets and the disposal of fecal matter; the collection and disposal of trash and garbage; the cleaning of streets and alleys, including weed and grass cutting; the elimination of mosquitoes; the inspection of stables and the prompt disposal of stable manure for fly prevention; the isolation of and quarantine of cases of communicable diseases; the supervision of milk supplies and the inspection of commissaries to insure proper protection of food supplies.

"The medical division is charged with the operation of seventeen dispensaries and emergency hospitals at various works and villages. In addition to the medical work, district physicians act as local health officers.

"The expense of the medical division is borne partly by the company and partly by the employees, through a system of voluntary contribution. Any employee living within a certain radius of the mines may request that he be placed on the 'medical list.' The paymen of $1.25 a month entitles him and his dependents to treatment for any possible ailment, also to professional service at the base hospital."

Physical examinations, pediatric clinics, dental clinics, outpatient cases and nutrition clinics constitute only a few of the multitudinous activities of this division. Training schools for both white and negro nurses are maintained at the base hospital.

The social science department operates separately in four divisions: education, welfare, physical education and school, home and community gardening. In villages it maintains a community center, consisting of a school, a place of worship, community house, instructors' home, recreation grounds, bathhouse and, in some places, men's club houses.

GEORGE GORDON CRAWFORD, *president of the Tennessee Coal, Iron & Railroad Co., indorsing Dr. Noland's statement regarding the value of this medical service to the organization, said in the Journal of Industrial Hygiene in February, 1926:*

"The Tennessee Coal, Iron & Railroad Co. has 383 employees who give full-time service in connection with the health department of the company. The health departments activities, comprising surgical, medical and sanitary work, are primarily in the direction of prevention and, secondarily, in the direction of cure.

"Naturally, the expenses of such an organization are very large in the total amount and yet the cost per capita to the beneficiaries of the work is small. The cost of this work is divided between the company and the employees, which is fair, as both derive benefit from it.

"The management of the Tennessee Coal, Iron & Railroad Co. is convinced that the work is profitable, both to the employee and the company, for many reasons. A dollar-and-cent reason is that from a given number of employees more days of work in the year are obtained by a higher standard of health; each day's work is more productive by reason of a higher standard of vitality and ambition, and thus the employee, being paid, where possible, by the ton or piece, is able to earn a larger amount for the maintenance of his family in more decent living conditions than would be the case were he able to work less punctually and less efficiently.

"The benefits from the above conditions to the company are obvious. For example, the labor turn-over in the Tennessee Coal, Iron & Railroad Co. during the past ten years has been reduced to one-third of what it used to be, and the healthiness of mind which generally accompanies an improvement in the health of the body has made for more contentment and there is less friction between labor and management.

"The work done for the families of the workmen probably has been more appreciated by them than has the work which has been done for the workmen themselves; the relief of the workman from anxiety, which naturally attends sickness in the family, in having his family in the hands of an adequate medical service, has been a great benefit.

"The management of the Tennessee Coal, Iron & Railroad Co. believes that the amount spent in the conduct of the health department of the company have been a profitable investment."

Alabama Power Blankets Mining Region

Martin Dam on the Tallapoosa River Forms the World's Largest Artificial Lake

SPECIALIZATION and mass production have the same general advantages in power generation and distribution that they have in other large industries. It is the net result—lower cost—which enables a power company to sell electric energy to the coal industry, an industry which itself is in the business of producing a raw material that finds extensive use in the production of electric energy.

Of the 170 or so active coal mines in Alabama, 100 are operated by purchased power. All of these are served by the Alabama Power Co. from an interconnected system extending far beyond the mining section.

The total installed generating capacity available is 743,375 hp., including a few small power plants that are leased, and including also the capacity which is available from interchange arrangements with large customers and with other power companies. Of the 448,105 hp. owned by the Alabama Power Co. 318,280 is at water-power plants and 129,825 at fuel plants.

Growth of a power company serving a section or community usually is an index of the growth and general prosperity of that community. In 1915 the maximum demand on the system of the Alabama Power Company was 29,500 kw. In 1927 the demand was over eleven times as great—348,280 kw.

The company owns 5,483 miles of transmission line. Of this, 86 miles operates at 154,000 volts, 1,221 miles at 110,000 volts, 1,750 miles at 44,000 volts and 11,000 volts, and 2,426 miles at 2,300 volts or less. Connected horsepower at the 100 coal mines which purchase electrical energy averages 850 per mine and totals 85,000.

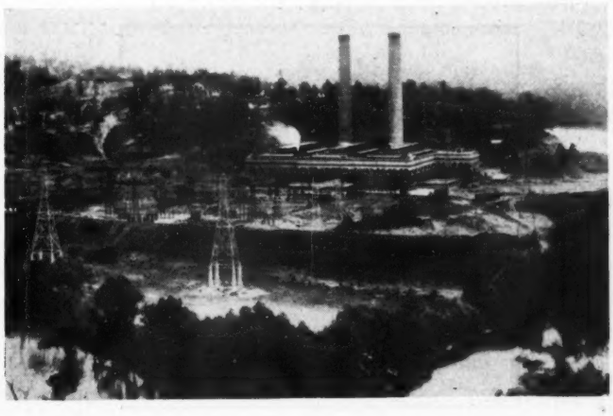
During the year ending Dec. 31, 1927, the average rate for the 78 services to coal mines was 1.33c. per kilowatt-hour, including demand and energy charges. This is lower than in many other mining fields.

In spite of the lower rates, however, the power costs per ton of coal mined are higher in Alabama than in some other mining fields. This is due to the higher consumption of energy per ton of coal. Operation of numerous hoists, washing plants and large fans is responsible. The general average is 7.1 kw.-hr. per ton, at a cost of 9.17c. per ton.

The energy and power cost figures vary considerably in the different seams. The averages for the Pratt seam are 7.5 kw.-hr. and 8.5c. Those for the Mary Lee seam are 5.48 kw.-hr. and 6.24c. Both of these coals are in the Warrior field.

The Black Creek seam, also in the Warrior field, has a much higher average. In this bed the power consumption averages 9.6 kw.-hr. per ton and the cost 11.6c. The range, however, is wide—4.48 kw.-hr. to 12.1 kw.-hr.

Gorgas Steam Plant Adjoins the Mine Supplying It with Fuel



In the Cahaba field the average for all seams is 9.05 kw.-hr. and 11.7c. In this field most of the mines are gassy and require considerable pumping.

The power rate schedule which has been in effect since October, 1923, includes a maximum demand charge based on a 15-minute period. The rate per month per kilowatt of demand is $1.50 for the first 100, $1.25 for the next 4,900, and $1 for all over 5,000.

Energy charges per kilowatt-hour are graduated for monthly consumptions as follows: first 1,000 at 3c., next 4,000 at 2c., next 15,000 at 1c., next 30,000 at 0.9c., next 50,000 at 0.8c., next 100,000 at 0.7c., next 100,000 at 0.6c., and all over 300,000 at 0.5c.

The power contract requires that a reasonably high power factor be maintained, and those mines capable of maintaining a power factor appreciably better than 80 per cent are offered a kilovolt-ampere type of contract, which is the same as that quoted above, except the demand charge is reduced by 25c. for each kilovolt-ampere established.

In Birmingham the power company maintains an engineering force to work out mine electrification problems and to advise with customers in mining and industrial fields in regard to hoist applications and so on. The division also guides customers in the most economical use of power, the idea being that prosperous and satisfied customers are more important than large power bills.

Blazing the Trail in Alabama

TO ALABAMA must be given credit for many of the innovations that have rendered coal mining more efficient and less hazardous. It was Erskine Ramsay, of Birmingham, who introduced the first revolving car dump in the United States. The practice of dumping several cars at one time on a revolving dump should be ascribed to him. To the same engineer should be given credit for first using shaking screens in the bituminous mines of the United States, and also for introducing feeders to regulate the passage of coal to such screens. He it was who first in the United States used the waste heat of coke ovens for the raising of steam. The sampler so successfully used to regulate dockage and permit of disciplining those loading dirty coal was devised by Mr. Ramsay.

Another engineer who has done much to develop the methods of the Alabama coal fields has been Robert Hamilton, now consulting engineer of the Tennessee Coal, Iron and Railroad Co. and for many years its chief engineer. He was the first to introduce locomotives and electric mining machines into Alabama. The first mine thus equipped was the No. 3 plant of the Tennessee company, the work being begun in 1903. It was Mr. Hamilton who was responsible for the cone settling tanks so successfully used at coal washers recently installed.

Though T. H. Butler, superintendent, Hanna Mines, Union Pacific Coal Co., in 1911 established the precedent of using water on the cutter bar of a machine, yet as that practice did not spread except into Utah and as it was more or less unknown until it was proposed anew by Edwin Ball, now deceased, who was then manager of mines for the Tennessee company, much credit should be given to that Alabama engineer. He discussed the matter with J. M. McHugh, general superintendent, and together the arrangements were made for this improvement which has greatly increased the safety, cleanliness and comfort of mines.

It was Robert Hamilton also who back in 1902 was the first man to consider the advisability of using skip hoists in the coal mines. H. F. Geismer, who was then the assistant engineer and is now a consulting engineer in Birmingham, designed the skip for the Docena mine of the Tennessee company, but it was not put in operation until about 1906.

P. B. Thomas in that same year introduced longwall at Aldrich, and chain conveyors were installed by his son Darius and W. S. Lovell, in 1927, as is set forth in greater detail in the article in this issue on the Montevallo operation.

Alabama's leadership in washing methods has long been conceded. The first successful washer in the state and perhaps in the United States was a Luhrig jig plant built at the City Furnace of the Sloss company in 1890.

Elwood A. Stewart, the inventor of the jig of that name, did most of his pioneer washery work at the mines of Alabama. The first Stewart jig was built at the Brookwood mine of the Alabama Co. in 1899, a mine now owned by the Sloss-Sheffield Coal & Iron Co. A Stewart washing plant at the mine of the Empire Coal Co. and two at the mines of the Republic Iron & Steel Co. are said to have been the first jig washers in Alabama that measured up to modern standards.

The Montgomery jig also was developed in the Alabama field. F. H. Crockard, now president of the Woodward Iron Co., was responsible when he was with the Tennessee company for most of the early work in the use of multi-compartment jigs.

The pioneer work with rock-dusting was done by the Sloss-Sheffield Steel & Iron Co., the Gulf States Steel Co. and the Tennessee company. To Milton H. Fies, vice-president and general manager of the DeBardeleben Coal Corporation, is credited the first installation of a belt conveyor to haul coal from the inside of a mine. Mr. Fies also was the first mine executive to introduce permissible powder into the mines of the State of Alabama.

B. F. Roden opened at Marvel the first commercial mine with modern equipment. He also was the first to get results on a commercial scale from the use of concentrating tables. Alabama is proud of its well-ordered mining villages. It must be recorded that it was F. H. Crockard who, when with the Tennessee Coal, Iron & Railroad Co., first introduced social service workers for miners' families. When he took charge of the Woodward Iron Co. he made a similar provision.

Alabama being in many ways remote from the other coal fields, has been sometimes a little slow to follow other states, but being enterprising, it has surprisingly often led the procession with new ideas and methods.

Strip Plant Works Two Benches

(Continued from page 631)

crossing of Lost Creek at a point where the stream was about 170 ft. wide and 45 ft. deep.

In the erection work the type 32 shovels, which are mounted on caterpillars, were first set up and used as cranes in erecting the large shovel.

Before crossing the creek with the large shovel soundings were taken at regular intervals in the creek bed, and two boiler shells were swung into place by the large shovel for use as waterways. The stripping shovel made a cut about 18 ft. in depth at the creek bank, carrying ahead of it sufficient material from the cut to make a roadway fill across the creek about 6 ft. above the water line. The shovel crossed on a "mat" made of timber slabs and ties on account of the soft nature of the fill, digging its way out on the opposite bank of the creek. Locomotives were mounted on skids and attached to the loading shovels, which dragged them to the operation. The entire operation of erection and transportation to the stripping operation was made without any accidents to men or machinery. The successful crossing is shown in the picture at the top of page 631.

Bosses Talk It Over

Due to lack of space, letters discussing last month's problem, "Costly Electrical Repair Supplies," will be printed next month with replies to this month's problem, which is stated on opposite page.

The BOSSES *Talk it Over*

GOOD WILL

"Jim," said the Old Man, by way of opening one of his well-known conferences with his superintendent, "some things of late have been worrying me. Mac's statement some time ago about so many of our men leaving us to go to Laurel Run when it reopened has brought my scattered thoughts to a climax. Why did they prefer Laurel Run? Why did they quit? Why *do* men quit? I think it is now time to stop a moment to consider what we have done, and where we are heading for.

"What do our foremen think of us? What do our workers think of our foremen, and consequently of our company? Here we are introducing refinements of management, the basic ideas of which are increased production per man, lower operating costs and increased employee earnings. We expect this to result in more contented workers.

"We are now drilling for our miners. We are blasting for them. They formerly did all this work themselves. We have thought that the division of labor could be extended in coal mining. We should use power to relieve the miners of irksome and burdensome tasks."

"That's all right," said Jim, "but don't forget that age-old traditions can't be overcome in a day or a year. We have to combat the inherent idea of the miner that these changes tend to destroy his initiative. By eliminating all these incidental jobs he fears he will be reduced to an automaton.

"Specialized jobs, production standards, production reports, labor budgets, supply budgets, planned and scheduled operations are only a few of the new management methods which we have introduced during the past year. This is enough to make anyone's head swim."

"What I want to know," said the Old Man, "is how do our foremen interpret our policies to our men? How well do our foremen understand these new policies and methods? To what extent do they themselves understand modern management methods such as we propose to use? In order to thoroughly 'sell' our policies to our men I believe we should first 'sell' them to our foremen. What do you say to starting a foreman's training course before we go any farther? Now Jim, I wish you would talk this over with Mac and Shorty right away."

—Is the Old Man right in the attitude he has taken toward his labor and his foremen?

—Of what should such a training course for foremen consist, and who should handle it?

—What should be the company's attitude toward the foremen during the Old Man's and Jim's attempt to modernize management methods?

—What should be the foreman's attitude toward the men?

All foremen, superintendents, electrical and mechanical men are urged to discuss these questions. Acceptable letters will be paid for

COAL AGE

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JOHN M. CARMODY, *Editor*

NEW YORK, OCTOBER, 1928

One result of co-operation

BACK of the uniformly better-than-average housing and living conditions found in Alabama mining communities lies conscious effort. It is true that a considerable portion of the tonnage originates in captive mines where better housing commonly maintains, but even this does not fully account for the progress. Irrespective of how much vision a few leaders possess general improvement comes only from co-ordinated effort.

The follow-through in this case is provided by the Alabama Mining Institute, headed by Hugh Morrow, president of the Sloss-Sheffield Steel & Iron Co., with James L. Davidson and H. E. Mills acting as a clearing house for the local chapters of the Holmes safety organization and thereby tying safety and community work together for the common good, particularly in outlying mining towns.

Co-operation is thus had, too, with the State Mining Department and with those state agencies that have to do with sanitation and education. No small amount of credit for progress is due to women, who either as welfare workers in the employ of leading companies or as wives of operators and mine officials, play an active part in house and town planning and in special work, one example of the latter being the work of Mrs. B. F. Roden at Marvel, whose husband is president of the Roden Coal Co. Probably to a greater extent than in any other field women have participated in these forward looking activities.

Should old mines be sealed?

FORTUNATE indeed was it that the Bureau of Mines selected R. D. Leitch to study the problem of acid mine drainage. The public needs the careful and unbiased determinations of an expert in the government service, and the mining industry itself is aided by any investigation that will forestall hasty and inconsiderate action.

Mr. Leitch as a result of his inquiry is disposed toward a belief that the acidity of mine water would be reduced if the mines were sealed tightly after abandonment. There is the objection, of course, that a sealed mine is likely to prove a menace to men working in other mines. Where it would be safe to seal a mine, however, it might be well to do it and watch its behavior.

Sealing would prevent the entrance of free air, as Mr. Leitch suggests, but that is not the only air entering a mine. Some is carried by the water which seeps into the measures over the coal. More is added as the water trickles through the crevices in the rock. Thus the water when it reaches the mine doubtless has a large quantity of oxygen and is quite capable of converting pyrite to sulphates. Consequently, sealing would by no means stop oxidation and solution entirely.

As it would raise the water it would cause large quantities of already formed sulphate crystals to be dissolved, increasing the acidity in large measure at least temporarily. In all mines there are large areas that are fairly well drained. By damming the mine exits these would be invaded by water that would dissolve the sulphate crystals with which the sides, the floor and the gobs are already lined.

Finally the sulphate crystals would all be dissolved and the acid water, it may be supposed, would seep away. Some might find a passage through limey clays and rocks and so become neutralized or at least rendered less acid. After the stored crystals were all removed the condition doubtless would greatly improve, especially as the water within the coal might be expected to stay there almost without change so long as the coal was continuously flooded. As there would be little movement of water through the coal little air could be conveyed to the pyrite within it and the oxidation would cease except such as would be superficial.

Another favorable condition might be that the aerated water when it arrived in the mine, being clean and light, would remain in a stratum by itself above the turbid, heavy, iron-hydrated waters below. Then perhaps, at least in the level parts of the mine, there would be a minimum of oxidation of pyrite and but little sulphate to dissolve.

It would be imprudent however, to assert that to be a fact without test. Mr. Leitch believes he has some evidences that the outcome of sealing would be good. That has been denied by some authorities, perhaps because of the solution of already formed sulphate crystals to which reference has been made.

Why should not a real test be made to find which is the right contention, the mine chosen for sealing being one that would not be likely to flood some other operation?

Dramatizing safety

SELDOM has the safety movement in coal mining been more dramatically brought to the attention of the citizens of an entire commonwealth than at Bluefield, W. Va., on Saturday, Sept. 22, when West Virginia observed its third annual State Safety Day.

Inspired by the leadership of Robert M. Lambie, chief of the Department of Mines, and the co-operation of Governor Gore, leading operators and the U. S. Bureau of Mines, one hundred and eighty

first-aid teams "did their stuff" before a crowd estimated at more than twenty thousand men and women. Responsible coal-operating officials participated in the day's activities to a greater extent than on any similar occasion.

For them, as well as for others who witnessed the drama, safety will take on a new meaning. One can only guess at the influence on safety thinking throughout West Virginia and nearby states that must follow such an event, particularly in view of the fact that Chief Lambie and his co-workers have had the vision and the good sense to select for the meet a different mining center each year.

Safeguarding life is an important function of the state. It is to be hoped that the success of the state meets already held in Huntington, Morgantown and Bluefield has impressed state legislators with the necessity for appropriating sufficient funds to enable the mining department to carry on this excellent work with dignity, for ultimately this safety drama is sure to spread to other states, and a sound financial basis is of the utmost importance.

Preparation and realization

HOWEVER much they may relish adding to their capital account or increasing their operating expenses few coal operators today can ignore the movement toward more scientific preparation of their product. Coal cleaning is by no means new either in this country or abroad. Many of the well-known methods have been in use for years and from time to time improvements have been made.

Only recently, however, has interest become so widespread that almost every operator in every field is either using, investigating or experimenting with one or more systems of preparation. Far-sighted men will plan to operate preparation plants, either wet or dry, on a two- or three-shift basis, thereby limiting the investment per ton mined. This is a natural outgrowth of the highly competitive situation that has gripped the coal business over a period of years.

So far as it improves quality and increases the confidence of consumers in the product, in the operator and in the industry, scientific preparation warrants much of the present enthusiasm. The investment, however, should justify itself through increased realization. Part of this will come through the elimination of waste, from middlings and from a larger proportion of sized coal, but some of it should very definitely come from a better price for added quality. Operators now have the problem of merchandising quality to customers who realize the new product is intrinsically worth more to them.

Altogether too frequently coal men have practically given away every technical advantage for which they have paid dearly in investment and in bold experiment. Why sell a Cadillac job for a Ford price?

Salvage

COLLAPSE of the ambitious plans for a large-scale merger of producing interests in the smokeless fields of West Virginia naturally is a source of keen disappointment not only to the operators directly involved but also to other districts that were looking to the proposed combination as a sorely needed stabilizing influence. But the failure to effect the merger ought not be a signal for a return to the conditions which induced the West Virginia operators to consider such a combination. Bitterness engendered by the failure should not be permitted to unseat sober judgment.

That there is grave danger that this may be the aftermath of the collapse is a fear much expressed at the present time. Observers are alarmed lest there be a continuation of the insensate internal competition which sacrifices profit to volume and creates a false sense of real values in the minds of the buyers of coal. It is this false sense of real values in the minds of the buyers which today is one of the most effective barriers to adequate sales realizations. If the smokeless producers will make this fear of cutthroat selling unwarranted they will have salvaged something really worth while from their late association.

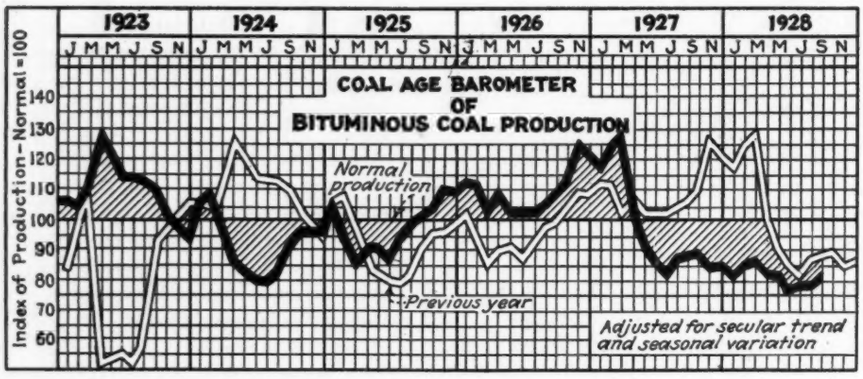
Thinner coal, bigger cars

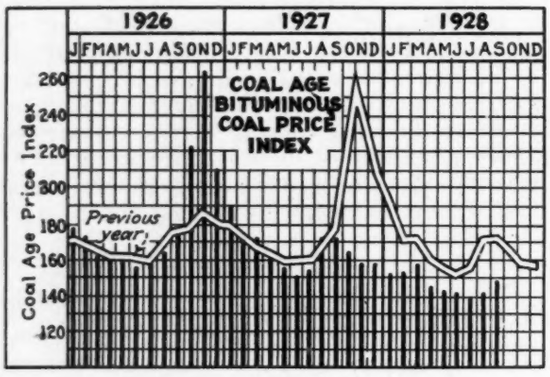
SOME operators who have thick and thin coal expect to cut down their cars when the thin coal has to be mined or at least a part of the side of each car so that coal can be shoveled over the sides. It is probable that even before the thin coal is reached they will be using conveyors and the "high" cars will long have been found to be too low for profitable operation; for when cars are loaded on the heading there is no need to have them low.

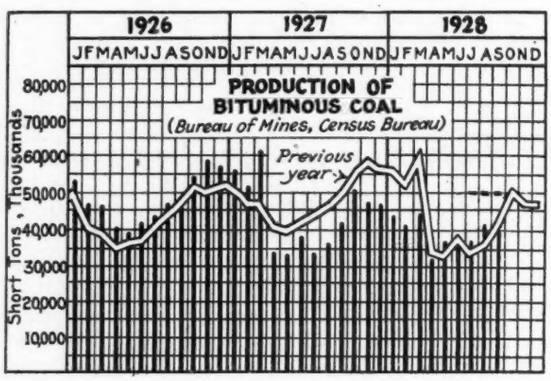
Thin coal is making a big car more desirable than ever. With loading heads the coal can be lifted without human effort into the highest of cars, and none of it, except perhaps the first half ton, which falls to the bottom of the car, drops any distance but is deposited lightly onto the talus of the pile already in place and rolls more or less gently to the bottom.

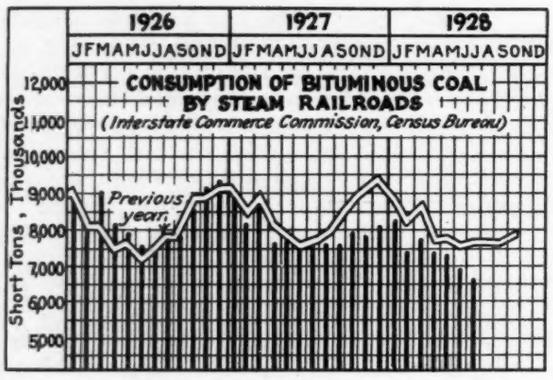
With the passing of room mining the low car will disappear as entirely outmoded. The main advantage of a low-bottomed car will then be that it will give bigger capacity to a car already capacious by reason of its height. The future mine car will be long and lofty. Moved everywhere by a locomotive, its weight will be no drawback, and as it does not travel the sharp curves at room necks there will be no reason for making it of short wheelbase, for even where gages are wide the cars will be able to negotiate the turns on main roads. Thus thin coal will mean larger, and still larger, cars rather than pigmy equipment.

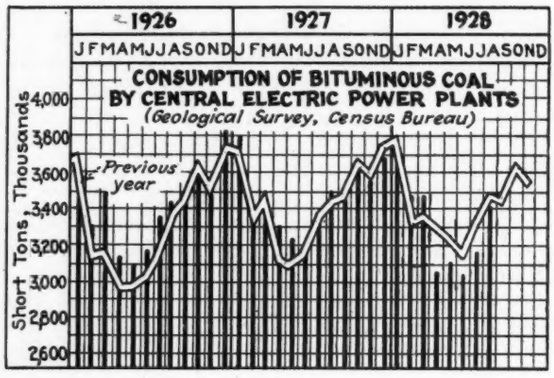
Indicators of Activities in the Coal Industry

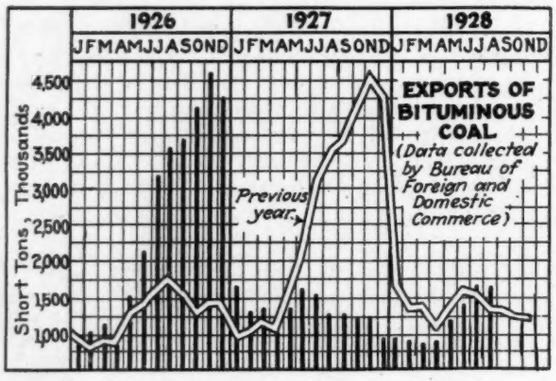


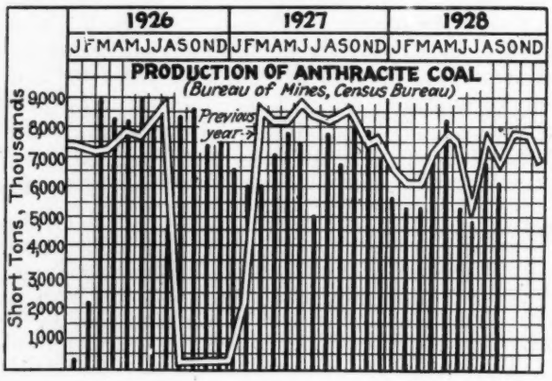












MARKETS *in Review*

FALL BUYING of coal for household consumption quickened interest in bituminous markets in the Middle West last month and brought on rising levels in spot prices on prepared coals in Kentucky and West Virginia with scattered gains in Illinois, Indiana and Ohio. States west of the Mississippi River also reported more active demand for domestic coal. In the East this demand was reflected in month-end calls for the large sizes of anthracite.

Despite the generally favorable commercial and financial reports on industrial conditions throughout the country, steam trade still lags in most sections. Along the Atlantic seaboard, however, more interest has been displayed in industrial commitments and the volume of coal moving to large consumers is expanding. Towards the close of September there was some hardening in quotations but little real upward swing.

Actualities in the steam-coal situation in the Middle West are thrown out of focus by the development of the rush demand for domestic coal. This demand naturally increased the quantity of steam sizes available for shipment and most districts serving that area have been unable to withstand the pressure to shade prices to move tonnage.

RESERVE stocks in the hands of industrial consumers are still far above the danger line. The latest report of the National Association of Purchasing Agents showed an increase of approximately 667,000 tons during August, making the total as of Sept. 1 in the United States and Canada 40,090,000 tons. These figures cover both anthracite and bituminous. In terms of days' supply the average in the hands of industries in this country increased one day.

August exports of coal and coke from the United States showed increases in coal and a falling off in foreign coke movement when compared with figures on July shipments. During August—the latest month for which data are available—anthracite exports were 277,771 gross tons; bituminous coal, 1,606,021 tons, and coke, 69,890 tons.

PRICES for the country as a whole, nevertheless, have advanced. *Coal Age* Index of spot bituminous prices (preliminary figure) last month was 148¾; the revised figure for August was 6 points lower. By weeks the preliminary September Index figures were 145 for the week ended Sept. 1; 145, Sept. 8; 146, Sept. 15; 150, Sept. 22, and 154, Sept. 29. The corresponding weighted average prices were $1.75, $1.76, $1.71, $1.81 and $1.86, respectively. Revised August figures were $1.74, $1.76, $1.72 and $1.70.

Bituminous production last month, according to estimates of the U. S. Bureau of Mines, was 40,865,000 tons, as compared with 41,108,000 tons in August and 41,763,000 in September, 1927. The daily average last month, however, was higher than in the other two months. Anthracite output dropped from 6,883,000 tons to 6,035,000 tons and the daily average from 255,000 to 251,000 tons.

Cargo dumpings of bituminous coal at the lower lake ports last month averaged over 1,000,000 tons per week. Total cargo dumpings for the season to Sept. 30 were 24,502,192 tons, compared with 26,108,033 tons for the corresponding period last year and 21,471,441 tons in 1926. Anthracite dumpings have been below the totals for recent years.

THE BREATH of Jack Frost created an unusually sharp demand for all domestic grades in the Chicago market toward the end of September. Light reserves in retail yards were reflected in hurried buying which sent up quotations on coal for early delivery. Western Kentucky jumped 25 to 50c.; Fourth Vein Indiana, 25c.; central Illinois, 15c.; low-volatiles, 25 to 50c.; Eastern high volatiles, 25c.

This spirited demand came after a long period of indifference during which "no bills" accumulated in all fields. After a few days of this buying many operators withdrew quotations because bookings already made foreshadowed troublesome accumulations on screenings. The demand was felt first in Eastern coals and then swung through to southern Illinois, western Kentucky and finally to Indiana, with all fields except southern Illinois increasing prices.

As a matter of fact there was a slight weakening in southern Illinois lists on prepared sizes the last of the month, but prices in general in this field were firmly held. In other Midwestern districts screenings were slow with prices slipping as the market for the larger coal broadened. Some Illinois and Indiana coal sold as low as $1 f.o.b. mine and western Kentucky was down to 40c. Despite the price situation the undertone was healthy with indications of heavier buying this month.

Wildcat strikes in Illinois following the ratification of the new wage

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Week Ended						
		Sept. 1, 1928		Sept. 8, 1928	Sept. 15, 1928	Sept. 22, 1928	Sept. 29, 1928	
	Market Quoted	Independent	Company	Independent	Independent	Independent	Independent	Company
Broken	New York	.....	$8.25@$8.50	.....	.....	.....	.....	$8.25@$6.50
Broken	Philadelphia	$8.50@$8.75	8.25	$8.50@$8.75	$8.50@$8.75	$8.50@$8.75	$8.50@$8.75	8.25
Egg	New York	8.50@ 8.75	8.75	8.50@ 8.75	8.50@ 8.75	8.50@ 8.75	8.50@ 8.75	8.75
Egg	Philadelphia	8.75@ 9.00	8.75	8.75@ 9.00	8.75@ 9.00	8.75@ 9.00	8.75@ 9.00	8.75
Egg	Chicago*	7.82	7.82	7.82	7.82	7.82	7.82	7.82
Stove	New York	8.85@ 9.10	9.10	8.85@ 9.10	8.85@ 9.10	8.85@ 9.10	8.85@ 9.10	9.10
Stove	Philadelphia	9.10@ 9.35	9.10	9.10@ 9.35	9.10@ 9.35	9.10@ 9.35	9.10@ 9.35	9.10
Stove	Chicago*	8.13	8.13	8.13	8.13	8.13	8.13	8.13
Chestnut	New York	8.40@ 8.75	8.75	8.50@ 8.75	8.40@ 8.75	8.40@ 8.75	8.50@ 8.75	8.75
Chestnut	Philadelphia	8.75@ 9.00	8.75	8.75@ 9.00	8.75@ 9.00	8.75@ 9.00	8.75@ 9.00	8.75
Chestnut	Chicago*	7.82	7.82	7.82	7.82	7.82	7.82	7.82
Pea	New York	4.50@ 5.00	5.00	4.50@ 5.00	4.50@ 5.00	4.50@ 5.00	4.50@ 5.00	5.00
Pea	Philadelphia	5.00@ 5.25	5.00	5.00@ 5.25	5.00@ 5.25	5.00@ 5.25	5.00@ 5.25	5.00
Pea	Chicago*	4.45	4.45	4.45	4.45	4.45	4.45	4.45
Buckwheat	New York	2.90@ 3.25	3.00@ 3.25†	2.85@ 3.25	2.90@ 3.25	2.85@ 3.25	2.85@ 3.25	3.00@3.25†
Buckwheat	Philadelphia	3.00@ 3.25	3.00@ 3.25†	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@ 3.25	3.00@3.25†
Buckwheat	Chicago*	2.90	2.90	2.90	2.90	2.90	2.90	2.90
Rice	New York	1.75@ 2.25	2.25	1.85@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	2.25
Rice	Philadelphia	2.25@ 2.50	2.25	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25@ 2.50	2.25
Barley	New York	1.45@ 1.75	1.70@ 1.75	1.50@ 1.75	1.45@ 1.75	1.45@ 1.75	1.30@ 1.75	1.70@ 1.75
Barley	Philadelphia	1.75@ 2.00	1.75	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75@ 2.00	1.75

*Net tons, f.o.b. mines. † Domestic buckwheat, (P. & R.) and $3.75 (D. L. & W.).

agreement also were a factor in stimulating demand. In St. Louis territory buying interest the last half of the month was keen in the larger sizes of coal. Steam business, however, continued backward and railroad buying was light. Strip pits were able to increase running time and close business at shaft-mine prices. Local car shortages were reported in southern Illinois.

Weather also was the touchstone reviving buying in the Kentucky fields—with demand, of course, centering upon the domestic sizes to the price disadvantage of slack. Retail orders were larger and there also was an increase in demand from industries and large office buildings for fuel for heating purposes. By and large improvement appeared imminent in railroad and public-utility consumption, with optimists forecasting industrial gains.

To date, however, steam demand has not caught up with the increased output of prepared sizes and slack has been entering the "distress tonnage" classification, with quotations from both eastern and western district mines as low as 50c. on the Louisville market and some cars on track offered for freight and demurrage. Mine-run also has been dragging but prices have been firm. Running time has improved with the larger domestic demand and better prices on sized coals.

COLDER WEATHER over the Northwest and an improvement in the industrial situation were responsible for a substantial expansion in movement of coal from the docks at the Head of the Lakes during the closing days of September. Retail yards bought eagerly to replenish depleted stocks and steel and iron interests in Minnesota and northern Wisconsin also were looking for immediate-delivery tonnage. As a result Superior and Duluth docks have been operating on a capacity basis.

Storms have slowed up the movement from the lower lake ports, but the slight decrease in receipts has been a real help to the docks in the matter of storage space. Bituminous stocks are estimated to have increased from 6,000,000 tons at the beginning of September to 7,700,000 tons at the close of the month, with practically no change in the anthracite reserves. Hard-coal receipts for the season probably will not exceed 650,000 tons. Demand for West Virginia smokeless coal grows.

PRICES on domestic grades in the Southwest were stronger last month but quotations on screenings were unsettled. Reopening of a number of Kansas shaft mines under the new wage agreement made quotations on shaft lump something more than nominal but depressed open market prices on screenings, which slid down to $1.75. A strike of miners at the strip pits, however, reduced the free supply of slack and sent the figure up to $2 while Oklahoma slack was selling down to $1.40, Missouri as low as $1.25 and Arkansas screenings down to $1.15.

Buying for winter storage has kept the demand for domestic grades in the Colorado-Wyoming fields on the upgrade. During the past month ruling prices have been as follows: Walsenburg and Canon City lump, $5.75; washed nut and chestnut, $4.75; Trinidad coking lump, $3.75; nut, $3.50; fancy chestnut, $3.25; Crested Butte anthracite furnace, egg or base-burner size, $9.50; brooder coal, $7.25; fancy northern lignite lump, $2.75; mine-run, $2.50; Rock Springs-Kemmerer lump, $5; nut, $4.50; steam, $1.25@$1.40.

Cincinnati welcomed the buying spurt as an overdue stranger for whom the feast had been prepared as early as July 4. Under the flood of orders for sized coal prices stiffened, with smokeless taking the lead to such an extent that some of the companies advanced their circulars on lump 25c. toward the end of the month. High-volatile block and lump also moved up and egg, which has been feeble, manifested signs of strength.

The depressed state of the market on slack, however, was a bitter pill for the Cincinnati optimists. Fifty cents to $1 was the general range on high-volatile offerings during the month and low-volatile was unable to top $1.25; some low-volatile tonnage was in the high-volatile price class. Gas and byproduct mine-run were fair but steam grades were neglected.

MOVEMENT of coal loads through the Cincinnati gateway held close to a weekly level of 13,500 cars during September, with lake loadings absorbing approximately 2,800 cars. At the opening of business Oct. 4 there were 16,455 cars of lake coal at all the ports and 4,767 cars in transit. The empty return movement appeared to be well balanced.

Columbus was another market to report a marked increase in demand for domestic sizes. There as elsewhere, however, the steam sizes failed to move up with the heavier retail and consumer buying. As a result steam-coal prices were weak and irregular. Much of the increased domestic buying came from retail dealers in the rural sections and in the smaller towns.

Dealers in the larger cities also found it necessary to increase their stocks. Householders showed a decided preference for the better grades. Demand for Ohio coal has been limited. After several weeks of anticipation the hoped-for improvement in buying at Cleveland materialized; it was accompanied, however, by no great pick-up in prices as weakness in mine-run and slack wiped out the gains made on prepared sizes of No. 8 coal.

Domestic grades held the center of the stage in the Pittsburgh market the past month. A slight tinge of winter weather made householders insistent in their demands for 3-in. lump. Indus-

Current Quotations—Spot Prices, Bituminous Coal, Net Tons, F.O.B. Mines

LOW-VOLATILE, EASTERN	Market Quoted	Week Ended Sept. 1, 1928	Sept. 8, 1928	Sept. 15, 1928	Sept. 22, 1928	Sept. 29, 1928
Smokeless lump	Columbus	$3.25@$3.50	$3.25@$3.50	$3.35@$3.60	$3.35@$3.75	$3.50@$3.75
Smokeless mine-run	Columbus	1.75@ 2.00	1.80@ 2.00	1.80@ 2.00	2.00@ 2.25	2.00@ 2.25
Smokeless screenings	Columbus	.85@ 1.00	.85@ 1.00	.85@ 1.00	.90@ 1.05	.90@ 1.10
Smokeless lump	Chicago	3.25@ 3.50	3.25@ 3.50	3.25@ 3.50	3.25@ 3.75	3.50@ 4.00
Smokeless mine-run	Chicago	1.75@ 2.25	1.75@ 2.25	1.60@ 2.25	1.75@ 2.25	1.90@ 2.25
Smokeless lump	Cincinnati	3.00@ 3.50	3.25@ 3.50	3.50	3.50@ 3.75	3.50@ 4.00
Smokeless mine-run	Cincinnati	1.85@ 2.25	1.90@ 2.25	2.00@ 2.25	2.00@ 2.25	2.25
Smokeless screenings	Cincinnati	.50@ 1.00	.50@ 1.00	.75@ 1.00	.75@ 1.10	.75@ 1.25
*Smokeless mine-run	Boston	4.00@ 4.15	4.10@ 4.20	4.15@ 4.25	4.20@ 4.30	4.25@ 4.35
Clearfield mine-run	Boston	1.40@ 1.75	1.40@ 1.75	1.45@ 1.80	1.45@ 1.80	1.45@ 1.85
Cambria mine-run	Boston	1.85@ 2.25	1.85@ 2.25	1.85@ 2.30	1.90@ 2.30	1.90@ 2.35
Somerset mine-run	Boston	1.50@ 1.90	1.50@ 1.90	1.55@ 1.90	1.55@ 1.95	1.60@ 2.00
Pool 1 (Navy Standard)	New York	2.30@ 2.50	2.30@ 2.50	2.30@ 2.50	2.30@ 2.50	2.25@ 2.50
Pool 1 (Navy Standard)	Philadelphia	2.30@ 2.60	2.30@ 2.60	2.30@ 2.60	2.30@ 2.60	2.30@ 2.60
Pool 1 (Navy Standard)	Baltimore	2.10@ 2.15	2.10@ 2.15	2.10@ 2.20	2.10@ 2.20	2.10@ 2.20
Pool 9 (super low vol.)	New York	1.70@ 1.95	1.70@ 1.95	1.70@ 1.95	1.70@ 1.95	1.70@ 1.95
Pool 9 (super low vol.)	Philadelphia	1.80@ 2.15	1.80@ 2.15	1.80@ 2.15	1.80@ 2.15	1.80@ 2.15
Pool 9 (super low vol.)	Baltimore	1.70@ 1.80	1.70@ 1.80	1.70@ 1.80	1.75@ 1.85	1.75@ 1.85
Pool 10 (h. gr. low vol.)	New York	1.55@ 1.85	1.55@ 1.85	1.55@ 1.80	1.55@ 1.80	1.55@ 1.80
Pool 10 (h. gr. low vol.)	Philadelphia	1.60@ 1.80	1.60@ 1.80	1.60@ 1.80	1.60@ 1.80	1.60@ 1.80
Pool 10 (h. gr. low vol.)	Baltimore	1.50@ 1.60	1.50@ 1.60	1.50@ 1.60	1.55@ 1.65	1.55@ 1.65
Pool 11 (low vol.)	New York	1.40@ 1.60	1.30@ 1.50	1.30@ 1.50	1.30@ 1.50	1.30@ 1.50
Pool 11 (low vol.)	Philadelphia	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65	1.40@ 1.65
Pool 11 (low vol.)	Baltimore	1.35@ 1.40	1.35@ 1.40	1.35@ 1.40	1.40@ 1.45	1.40@ 1.45
HIGH-VOLATILE, EASTERN						
Pool 54-64 (gas and st.)	New York	$1.25@$1.40	$1.25@$1.40	$1.25@$1.40	$1.25@$1.40	$1.25@$1.40
Pool 54-64 (gas and st.)	Philadelphia	1.25@ 1.40	1.25@ 1.40	1.25@ 1.40	1.25@ 1.40	1.25@ 1.40
Pool 54-64 (gas and st.)	Baltimore	1.15@ 1.35	1.15@ 1.35	1.15@ 1.35	1.20@ 1.40	1.20@ 1.40
Pittsburgh sc'd gas	Pittsburgh	2.00@ 2.10	2.00@ 2.10	2.00@ 2.10	2.00@ 2.15	2.00@ 2.15
Pittsburgh gas mine-run	Pittsburgh	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90	1.75@ 1.90
Pittsburgh st. mine-run	Pittsburgh	1.40@ 1.80	1.40@ 1.80	1.40@ 1.80	1.50@ 1.80	1.60@ 1.80
Pittsburgh gas slack	Pittsburgh	1.15@ 1.20	1.05@ 1.20	1.00@ 1.20	1.00@ 1.20	1.00@ 1.20
Kanawha lump	Columbus	1.80@ 2.10	1.80@ 2.15	1.90@ 2.25	2.00@ 2.50	2.25@ 2.75
Kanawha mine-run	Columbus	1.25@ 1.60	1.35@ 1.70	1.30@ 1.70	1.40@ 1.70	1.35@ 1.75
Kanawha screenings	Columbus	.90@ 1.00	1.00@ 1.15	.90@ 1.05	1.00@ 1.10	1.00@ 1.10
W. Va. lump	Cincinnati	1.50@ 2.50	1.50@ 2.50	1.65@ 2.50	1.65@ 2.50	1.75@ 2.75
W. Va. gas mine-run	Cincinnati	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
W. Va. steam mine-run	Cincinnati	1.10@ 1.40	1.15@ 1.40	1.15@ 1.40	1.15@ 1.40	1.15@ 1.40
W. Va. screenings	Cincinnati	.50@ 1.00	.50@ 1.00	.50@ 1.00	.50@ 1.00	.50@ 1.00
Hocking lump	Columbus	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25	2.00@ 2.25
Hocking mine-run	Columbus	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75	1.60@ 1.75
Hocking screenings	Columbus	1.00@ 1.10	.90@ 1.00	.90@ 1.00	.90@ 1.10	.90@ 1.10
Pitts. No. 8 lump	Cleveland	1.75@ 2.15	1.75@ 2.25	1.75@ 2.25	1.75@ 2.15	1.90@ 2.25
Pitts. No. 8 mine-run	Cleveland	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.40@ 1.75	1.35@ 1.60
Pitts. No. 8 screenings	Cleveland	1.00@ 1.25	.90@ 1.15	.90@ 1.15	.90@ 1.10	.90@ 1.10

*Gross tons, f.o.b. vessel, Hampton Roads

trial demand, on the other hand, was unsettled and the failure of the market to absorb slack took the edge off gains made on the domestic side of the trade. Railroads bought some scattered lots of steam mine-run but their purchases were sporadic.

Central Pennsylvania also found the outlook improving as the week rolled by. Production rose from approximately 555,000 tons the first week of the month to approximately 683,000 tons during the last week of September. During the same period the average number of "no bills" dropped from a daily average of 1,459 to 1,384 cars. With increasing demand came a firmer undertone to prices.

In New England the steam-coal market revealed a distinct improvement last month. Perhaps the most striking evidence of this is seen in the upward movement of prices on all-rail coals from central Pennsylvania. Clearfield and Somerset coals closed the month at the highest average since the end of June; Cambria County at the highest figure since early last April.

TIDEWATER coals, which dominate the New England market, marched steadily forward in price throughout the month. Closing quotations on Navy Standard Pocahontas and New River mine-run were highest named in the Boston market during the current year. The month-end asking price was $5.60 on cars at Boston and sales were made at $5.50@$5.55. Nut-and-slack quotations touched $5.25 on cars, with business moving at $5@$5.15.

F.o.b. vessels at Hampton Roads the market has been consistently firm, with levels moving up from $4@$4.10 to $4.25@$4.35—and little coal to be had at $4.25. Nut-and-slack f.o.b. the Roads commands $3.80, with no active solicitation upon the part of sellers of either mine-run or nut-and-slack. Contracts are absorbing the bulk of the movement and the spot market readily swallows the surplus available under a system of wisely controlled production.

Conditions in the New York bituminous market also registered betterment the past month. Demand was stronger. Some of the smaller central Pennsylvania operations reported sufficient orders on hand to keep their mines going through October at prices averaging 10c. above those recently prevailing in the spot market. Western demand for smokeless leaves local factors with little surplus West Virginia coal to offer New England buyers.

PHILADELPHIA admits a heavier movement of tonnage to industrial consumers but complains that the price situation is still unfavorable to the seller. Another complaint is the continued refusal of the fair-sized users to come into the market for storage fuel. Outside of the gas and electric utilities there seems to be little disposition to rebuild falling reserve stocks.

The attitude of the railroad interests also is disappointing to the Philadelphia trade. There is a belief, however, that this situation will be changed within the next few weeks and that some carriers may close orders for substantial blocks of tonnage. Inquiries from the general run of industrial consumers are more frequently translated into orders than a short time ago.

Baltimore appears to have responded more feebly to the buying wave than any other city on the North Atlantic seaboard. There was a slight increase in interest displayed after Labor Day, but hand-to-mouth buying has continued to be the rule. Buyers are beginning to express concern over the possibilities of an advance in mine prices, but spot trade remains relatively quiet.

WEAKNESS permeated the Birmingham market throughout September. Spot trade was dull the entire month with consumers interested only in sufficient tonnage to cover immediate requirements. Keen competition between producers of middle and low-grade coal gave these buyers a distinct advantage in the matter of price. Contract shipments were at a minimum, bunker trade was light and there were no signs that October would usher in active steam-coal buying.

Domestic grades, however, began to move in better volume during the last half of the month. Spot orders drifted in from a wide area and the aggregate represented a material improvement over the volume of sales in recent months. With a dull market for slack the free supply of domestic sizes is limited. Big Seam lump was quoted at $1.75@$2.25; Carbon Hill, $2.25@$3; Cahaba, $4.25@$5; Black Creek, $4.50@$4.75; Montevallo, $5@$5.75.

There was a freer movement of domestic anthracite through the New York market in September, with household demand quickened by low temperatures. Chestnut was the backward size in the metropolitan district. Stove and egg were active and advertising helped pea. The steam sizes moved in fair shape throughout the month. October prospects appear bright.

UNTIL the cold wave toward the end of the month the wholesale movement of domestic anthracite in the Philadelphia market was disappointing. A falling mercury sent householders scurrying for coal and this demand was reflected later in increased orders from retail distributors which cut into mine surpluses of nut and pea and put stove into the scarce category. The steam market has been in a comfortable position, with buckwheat leading and barley trailing.

After a slow start the Baltimore retail market showed more life as the month advanced and there was a moderate expansion in consumer buying. The credit situation, however, is still a drawback. Boston also reported a better demand for domestic anthracite and the stimulus of colder weather was reflected more or less generally throughout anthracite-consuming territory.

Canada still held first place as a buyer of coal from United States mines, taking 275,078 tons of anthracite and 1,470,356 tons of soft coal during the month.

Current Quotations—Spot Prices, Bituminous Coal, Net Tons, F.O.B. Mines

		Week Ended				
MIDDLE WEST	Market Quoted	Sept. 1, 1928	Sept. 8, 1928	Sept. 15, 1928	Sept. 22, 1928	Sept. 29, 1928
Franklin (Ill.) lump	Chicago	$3.00	$3.00	$3.00	$2.90@$3.00	$2.90@$3.00
Franklin (Ill.) mine-run	Chicago	2.25@ 2.40	2.25@ 2.40	2.25@ 2.40	2.25@ 2.40	2.25@ 2.40
Franklin (Ill.) screenings	Chicago	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60	1.40@ 1.60
Central (Ill.) lump	Chicago	2.40@ 2.50	2.40@ 2.50	2.40@ 2.50	2.40@ 2.50	2.40@ 2.65
Central (Ill.) mine-run	Chicago	1.85@ 2.25	1.85@ 2.25	1.85@ 2.25	1.85@ 2.25	1.85@ 2.25
Central (Ill.) screenings	Chicago	1.20@ 1.55	1.20@ 1.55	1.20@ 1.55	1.20@ 1.55	1.10@ 1.50
Ind. 4th Vein Lump	Chicago	2.40@ 2.75	2.40@ 2.75	2.40@ 2.75	2.50@ 3.00	2.75@ 3.00
Ind. 4th Vein mine-run	Chicago	1.40@ 2.25	1.40@ 2.25	1.40@ 2.25	1.40@ 2.25	1.40@ 2.25
Ind. 4th Vein screenings	Chicago	1.10@ 1.70	1.10@ 1.70	1.20@ 1.50	1.20@ 1.50	1.15@ 1.30
Ind. 5th Vein lump	Chicago	2.10@ 2.40	2.10@ 2.40	2.10@ 2.40	2.10@ 2.40	2.10@ 2.40
Ind. 5th Vein mine-run	Chicago	1.15@ 2.10	1.15@ 2.10	1.25@ 2.00	1.25@ 2.00	1.25@ 2.00
Ind. 5th Vein screenings	Chicago	.80@ 1.15	.80@ 1.15	.85@ 1.25	.85@ 1.25	.90@ 1.20
Mount Olive lump	St. Louis	2.35	2.35	2.35	2.50	2.50
Mount Olive mine-run	St. Louis	2.00	2.00	2.00	2.00	2.00
Mount Olive screenings	St. Louis	1.40	1.40	1.35	1.25	1.25
Standard lump	St. Louis	2.00	2.00	2.15	2.25	2.35
Standard mine-run	St. Louis	1.75	1.75	1.75	1.75	1.75
Standard screenings	St. Louis	1.10	1.00	.80	.60	.40
West Ky. block	Louisville	1.25@ 1.75	1.25@ 1.75	1.25@ 1.75	1.65@ 1.75	1.75@ 2.00
West Ky. mine-run	Louisville	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.25	1.00@ 1.30
West Ky. screenings	Louisville	.65@ .90	.75@ .90	.50@ .90	.50@ .60	.50@ 1.10
West Ky. block	Chicago	1.35@ 1.75	1.35@ 1.75	1.35@ 1.75	1.50@ 1.85	1.75@ 2.00
West Ky. mine-run	Chicago	.85@ 1.25	.85@ 1.25	.85@ 1.25	.85@ 1.25	.85@ 1.25
West Ky. screenings	Chicago	.50@ .65	.50@ .65	.50@ .65	.45@ .60	.40@ .60
SOUTH AND SOUTHWEST						
Big Seam lump	Birmingham	$1.75@$2.25	$1.75@$2.25	$1.75@$2.25	$1.75@$2.25	$1.75@$2.25
Big Seam mine-run	Birmingham	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50	1.25@ 1.50
Big Seam (washed)	Birmingham	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00	1.50@ 2.00
S. E. Ky. block	Chicago	1.75@ 2.25	1.75@ 2.25	1.75@ 2.25	1.75@ 2.50	2.00@ 2.50
S. E. Ky. mine-run	Chicago	1.40@ 1.95	1.40@ 1.95	1.40@ 1.95	1.40@ 1.95	1.40@ 1.95
S. E. Ky. block	Louisville	2.00@ 2.50	2.15@ 2.50	2.15@ 2.50	2.00@ 2.75	2.50@ 3.00
S. E. Ky. mine-run	Louisville	1.30@ 1.60	1.30@ 1.60	1.30@ 1.60	1.35@ 1.75	1.50@ 1.75
S. E. Ky. screenings	Louisville	.50@ 1.10	.50@ 1.00	.45@ 1.00	.40@ .90	.40@ 1.00
S. E. Ky. block	Cincinnati	1.65@ 2.50	1.65@ 2.50	1.75@ 2.50	1.75@ 2.50	2.00@ 2.75
S. E. Ky. mine-run	Cincinnati	1.10@ 1.60	1.10@ 1.60	1.15@ 1.60	1.15@ 1.60	1.15@ 1.65
S. E. Ky. screenings	Cincinnati	.50@ 1.00	.50@ 1.00	.50@ 1.00	.50@ 1.00	.50@ 1.00
Kansas shaft lump	Kansas City	3.75	3.75@ 4.00	3.75@ 4.25	4.00@ 4.50	4.50
Kansas strip lump	Kansas City	3.25	3.25	3.25	3.25@ 3.50	3.50
Kansas mine-run	Kansas City	2.75	2.75	2.75	2.75	2.75
Kansas screenings	Kansas City	1.85@ 2.00	1.80@ 1.90	1.75	1.75@ 2.00	2.00

WORD *from the* FIELD

Miners Restive at Efforts To Settle Wage Question

Wildcat strikes in the Belleville and Peoria districts were the first response to the ratification of the new Illinois agreement by a vote of 26,838 to 25,497. The new contract, which establishes a base rate of $6.10 per day, went into effect at midnight Sept. 15. The outlaw strikes, however, caused little concern.

Following the ratification of the agreement a number of Illinois mines which had been closed down while the temporary scale of $7.50 was continued reopened. According to reports from union sources, 20,000 workers have returned to the mines in Illinois since the new contract became effective. In the northern part of the state, however, operators are still holding out for lower wages and some attempts at open-shop operation are being made. The union has asked for a conference with the northern producers.

The Indiana deadlock still continues with operators insisting on a $5 scale and the miners holding out for the Illinois base. Several conferences have been held in Wyoming without a new agreement being reached. Iowa operators and miners have compromised their differences on a $5.80 scale, the ratification of which also caused a number of men to walk out.

Central Pennsylvania operators remain firm in their rejection of overtures by district union officials to renew wage parleys. The National Miners' Union, a rival to the United Mine Workers, has called a conference at Portage, Pa., Oct. 14, but it is not believed that much attention will be paid to this meeting by either miners or operators.

Following the Illinois agreement some of the smaller operations in western Kentucky announced wage reductions, but the proposal was frowned upon by the larger factors in that field.

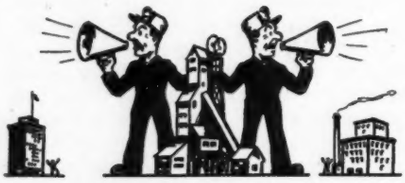
Favor Voluntary Correction Of Trade Practices

Stabilization of the coal industry by voluntary action is preferable to corrective action by the government, the Assistant to the Attorney General, William J. Donovan has informed representatives of the bituminous coal industry who went to Washington recently to consult with the Department of Justice and the Federal Trade Commission regarding trade practices in the industry.

Colonel Donovan, it was stated, told the operators that the solution of the problems in the soft-coal industry is to be found along lines of the adoption of code of business ethics, which might include a statement of trade terms, and in the collection and dissemination of such information concerning the industry as will make possible intelligent competition.

The operators also conferred with Federal Trade Commissioner Abram F. Myers. Although there was no commitment on the part of the industry as the result of the conferences, it was explained, a report on the subject will be presented to the meeting of the National Coal Association at Cleveland, Ohio, Nov. 14.

The operators participating in the informal conferences were E. C. Mahan, president and C. E. Bockus, treasurer, National Coal Association; C. C. Dickinson, president, Dry Branch Coal Co., and chairman of the trade information committee of the association; H. A. Glover, vice-president, Knox Consolidated Coal Co., and chairman of the association's marketing committee; J. W. Searles, president Pennsylvania Coal & Coke Corporation, and H. L. Findlay, Ohio, vice-president, Youghiogheny & Ohio Coal Co. They were accompanied by Executive Secretary Gandy.



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Ralph W. Clark

Newly elected vice-president and general sales agent of the Hudson Coal Co., succeeding D. F. Williams, who recently resigned. Mr. Clark, who will have his headquarters at Scranton, Pa., lately resigned from the vice-presidency of Pilling & Co., selling agent for the Chateaugay Ore & Iron Co., owned by the Delaware & Hudson Co.

Coal Stocks Show First Gain Since Spring of 1927

Bituminous coal stocks in the United States increased about two-thirds of a million tons during August, according to the monthly report of the National Association of Purchasing Agents. This is the first advance since April 1, 1927, when stocks were at their peak prior to the coal strike.

Total anthracite and bituminous coal stocks in the United States and Canada on Sept. 1 were 40,090,000 net tons. During August 33,890,000 was consumed, so that there was a supply sufficient for 37 days based on the current rate of consumption. Stocks now are approximately equivalent to those of two years ago, a normal year for bituminous coal. Consumption during August was approximately equivalent to that of a year ago.

DAYS' SUPPLY OF SOFT COAL IN VARIOUS INDUSTRIES

		Change
Byproduct coke	23	+2
Electrc utilities and coal-gas plants	55	+4
Railroads	33	—3
Steel mills	33	—2
Other industries	36	—2
Average total stocks throughout the country	37	+1

ESTIMATES OF OUTPUT, CONSUMPTION AND STOCKS

	U. S. Production	Industrial Consumption	On Hand in Industries
Sept.	48,592,000	33,195,000	59,179,000
Oct.	51,400,000	35,813,000	60,154,000
Nov.	47,100,000	35,514,000	57,940,000
Dec.	47,309,000	37,225,000	55,725,000
Jan.	49,645,000	37,678,000	52,909,000
Feb.	46,933,000	36,301,000	50,595,000
March	49,542,000	38,588,000	48,388,000
April	39,081,000	35,230,000	47,432,000
May	44,748,000	34,844,000	43,670,000
June	41,264,000	32,784,000	40,890,000
July	41,785,000	33,527,000	40,700,000
Aug.	48,598,000	33,890,000	39,415,000
Sept. 1	.....	.....	40,090,000

Bituminous coal stocks held by railroads of the country on Aug. 15 showed a decrease of 605,640 tons from the reserves held on Aug. 1, according to reports made to the American Railway Association. Total stocks held by the carriers on Aug. 15 were 10,870,865 tons, consisting of 2,340,370 tons in cars and 8,530,495 tons in ground storage.

OFFICIAL CHANGES in the Pennsylvania Coal Co. have been announced by John C. Brydon, general superintendent, as follows: William Muir, mine foreman at No. 14 shaft, No. 14 colliery, Pittston, Pa., has been promoted to the post of colliery superintendent at No. 5 colliery, Dunmore. Harry Yewens, heretofore superintendent at both No. 1 and No. 5 operations, will devote his entire attention to No. 1 as superintendent.

World Fuel Conference in London Significant of Widespread Interest In Coal Production and Treatment

By H. W. Brooks
Consulting Engineer

LONDON, ENGLAND, Oct. 6.—Fifteen hundred delegates representing forty-eight countries presented 170 papers, two-thirds of them concerning coal, before the World Fuel Conference, which has been in session here for the past two weeks. The meeting was the largest of its kind ever held. Pulverized fuel, high- and low-temperature carbonization and utilization of fuels for steam generation were among the principal topics discussed.

The keynote of the meeting might be described as an international correlation of technical and scientific effort to exploit every possible element of economic value in coal. Lord Reading, who presided, pointed out in his opening address that whereas in the past such effort had ofttimes proved all too selfishly nationalistic, such meetings as these hailed a new era in international co-operation and thus undoubtedly would mark an important step in that desideratum so eminently desired by all—world peace and prosperity.

To give an idea of how basically the national existence of many nations depends on coal it was estimated by Sir Robert Horne that one-twelfth of the population of Great Britain were dependent on the coal industry for their livelihood and four-fifths of the volume of exports and one-tenth of their value normally consisted of coal. Sir Robert felt indeed that no general return to prosperity in England could be expected until the outstanding problems of the British coal industry (which incidently correspond closely with our own in America) had first been solved.

IN THE first session, on Sept. 24, speakers from Britain, Russia, the Netherlands and America drew attention to the need for a universal system of coal classification which would embrace coals of all classes and one which would satisfy the requirements of scientific investigators, fuel technologists and the commercial world. The excellent work of the American Engineering Standards Committee in conjunction with the American Society for Testing Materials was described by A. C. Fieldner, of the U. S. Bureau of Mines.

"It is conceivable that other coal-producing countries may organize similar committees who may eventually co-operate in agreeing on a uniform system for all countries," said Mr. Fieldner. "It is apparent from the papers that lack of uniformity and positive confusion exists in regard to the classification of lignitic coals, particularly in distinguishing between brown coals and lignite."

Exceedingly interesting papers on the utilization of low-grade fuels were contributed from Australia, Dutch East Indies, Japan, Roumania and Czechoslovakia. The special needs for the efficient utilization of non-coking lignitic coals of high moisture content received considerable attention. In Japan the Asorbus carbonizer, described by Dr. Kamo, in many respects bears a similarity to the well-known rotary retort operated for several years at Fairmont, W. Va., and apparently from the table of yields given by Dr. Kamo and the property of the products gives considerable promise of success with Korean coals. This is particularly true if the carbonization is combined with pulverized-fuel firing at the mines.

IN ROUMANIA the Institute of Industrial Chemistry has obtained satisfactory results in the distillation of Roumanian lignites at low temperature. The primary coke from this process is a briquet with a binder containing 97 per cent of lignite tar. High-temperature carbonization of lignites and subsequent briquetting has been practised in Roumania on a commercial scale for several years with economically successful results.

The second section took up the sampling and testing of solid fuels. Here again the pressing need for international co-operation was evident and the German committee introduced a resolution suggesting the appointment of a committee from the leading technical societies of coal-producing countries to study the possibilities of an eventual international agreement along these lines.

In general the discussion during this session included sampling, various methods of making proximate and ultimate analyses, determinations of calorific value, caking indices, specific gravities and reactivities for steam and carbon dioxide as regards ignition temperatures in the various participating nations.

IN CALCULATING calorific value some nations use the so-called gross calorific value while others use the net calorific value; in Germany standard specifications for conducting guarantee tests of steam-raising plants usually are reported on both bases. The German delegates state that their experience proves that efficiencies based on gross value are not satisfactory and that net values always should be used. Calculations made and curves given indicate that the efficiency of a particular installation consuming the same fuel may change considerably if derived from the gross value with variations in the moisture content of the fuel but that the efficiency derived from the net value is liable to but small variation.

The third session dealt with coal treatment, particularly as regards cleaning, drying and briquetting. These papers covered the following subjects: Description of coal-cleaning processes; principles of pneumatic separation; new types of pneumatic separator; comparison of coal-cleaning processes; dewatering and drying bituminous coal; drying of brown coal.

Of the coals cleaned in Europe about 90 per cent are treated in jigs of various types or in Rhéolaveur washers, but there are a number of other processes which have merit for special purposes and frequently are worthy of consideration under special conditions. J. R. Campbell gave interesting particulars of American practice with the Rhéolaveur process, concentrating tables and the Menzies hydro separator. Froth flotation was described at some length by Professor Edsor and Mr. Williams.

Messrs. Raw and Ridley, of Great Britain, described at length the principles used heretofore in pneumatic separators and also outlined their most interesting efforts to improve upon the efficiency of pneumatic separation of unsized coal through the invention of an entirely new process known as the "Static Dry Washer." The various types of appliances that may be used to dewater and dry coal are: Drainage hoppers and conveyors, dewatering screens, vacuum filters, centrifuges and direct dryers. A rational scheme for dewatering washed coal is suggested by Mr. Campbell as follows: (a) Dewater the fine coal above $\frac{5}{8}$ in. by natural drainage; (b) centrifuge the coal from $\frac{5}{8}$ in. to 48 mesh; (c) dry the slimes (48 mesh to 0) by heat. This scheme is being put into practice at a washery being constructed at Pittsburgh.

HEAT drying of fine coal for pulverized-fuel firing and the drying of brown coal together with various methods for their accomplishment in Great Britain and in Austria were discussed.

At the session on storage and handling of solid fuels by the user the papers presented covered storage; loading into storage or into ships, etc.; unloading; handling by the user, and blending arrangements.

The discussion covered various types of plants suitable for blending, the relative advantages of different forms of loading, unloading and conveying plants and the storage, handling and transport of powdered coal.

Two of the most important sessions of the meeting were devoted to economic and general consideration of the carbonization industry and the composition, classification, preparation, storage and handling of its products. Among the subjects discussed was coke preparation—practice and economics—unification of the coking industry and co-ordination with the steel plant, carbonization as national economy, the pro-

duction of smokeless fuel, developments in the methods of manufacture of both coal and oil gas and most recent developments throughout the world in bulk carbonization.

W. H. Blauvelt contributed his valuable paper entitled "Coke-Oven Practice and Developments in Bulk Carbonization" and the U. S. Bureau of Mines offered a paper on "Domestic Fuels Other Than Anthracite," giving in diagrammatic form valuable data relating to the economics of the coking industry.

IN THE session on the utilization of fuel for steam generation and the production of electricity some of the points stressed that are of interest to the coal industry were: Prevention of nuisance from products of combustion, smoke, dust and ashes; the advantages of coal distillation yielding byproducts before using the coal for the production of steam; advantages and disadvantages of various plants for pulverized fuel for use on land and sea; the best forms of mechanical stokers especially for use at sea; oil versus coal for generating steam and power; the relative advantages of various classes of coal for use in locomotives; methods of effecting economy in coal consumption by locomotives.

Still another session covered the utilization of fuel for industrial furnace work, touching particularly upon applications to the steel, ceramic and cement industries. In a paper entitled "Low-Grade Fuel for Blast-Furnace Coke," prepared by the Power Association of Japan, was given a complete account with many tables and curves showing how a fairly good coke suitable for blast-furnace work is being made in Japan from low-grade coals by careful preparation and proper heating.

Recognizing the important place of women in domestic-fuel usage it was particularly fitting that the internationally known fuel technologist, Dr. Margaret Fishenden, should have been vice-chairman of the session for the utilization of fuels for domestic purposes. She also presented one of the most interesting papers of the conference, entitled "A Comparative Study of Solid Fuel, Gas, Electricity and Oil for Domestic Purposes." Dr. Fishenden was the only woman delegate.

AT THE present time about 15 per cent of the total coal mined throughout the world, or in the aggregate some 180,000,000 gross tons annually, is consumed in its raw state for domestic purposes. In this session the extent to which this enormous quantity of household coal could be replaced efficiently and economically by other sources of energy themselves derived from coal was discussed in detail.

The most important of these derivatives are the products from the carbonization or distillation of coal—particularly coal gas and gas coke—and electricity generated from coal. It is estimated that the world consumption in each of these industries is about 5 per cent of the coal used for all purposes.

POWDERED coal proved to be the most engrossing topic of discussion at the World Fuel Conference. No less than ten papers on this subject were delivered, and the progress of experiments in various countries was outlined with lively interest. Scarcely less notable was the presence of one woman delegate among the 1,500—Dr. Margaret Fishenden, British fuel technologist, who for the last five years has been working under the Department of Scientific and Industrial Research of Great Britain on problems relative to domestic heating. She presented a paper entitled "A Comparative Study of Solid Fuel, Gas, Electricity and Oil for Domestic Purposes."

Other matters of interest discussed were various methods of heating buildings, cooking foods and heating water, kitchen installations, conditions of maximum efficiency in heat production, methods of charging for gas and electricity, and coke versus raw coal in the home.

That powdered coal apparently still holds deep interest among fuel technologists is attested by the ten papers presented in this group. The papers covered the following headings:

(a) Research on the preparation and utilization of powdered fuels.

(b) Powdered fuel for power station work.

(c) Powdered fuel for metallurgical work.

(d) The combustion of "unusual" fuels in powdered form.

(e) The utilization of powdered fuel in marine practice.

As is generally known, there still remains to be solved a number of problems concerning the design of combustion chambers, fineness of grinding, fusion point of coal ash, the grinding process itself, the transport of the powdered coal and the disposal of flue dust in pulverized-fuel fire plants.

IN A PAPER entitled "Some Selected Topics in Pulverized Research in Germany," Dr. Förderrenther discussed German research in the fineness of pulverized coal and the need of the standardization of sieves both as regards size of aperture and form of sieve adopted. As a result of this and in co-operation with the German committee H. W. Brooks offered a resolution suggesting international co-operation of qualified engineering societies in anticipation of an eventual international pulverized-fuel standardization committee whose purpose would be to define and correlate the necessary research of engineering and scientific organizations concerned with this subject throughout the world.

Interest was particularly manifest in the new use of powdered coal for marine service, the feeling being expressed that although all the problems of the new art have by no means been yet solved, it was only a question of time until they would be. Meanwhile, dwindling of known world oil resources and the probability of advancing prices made it desirable that research be speeded to the maximum possible extent. Although Mr. Brooks' paper was the only one presented on pulverized coal in marine service the discussion revealed intense interest in the experiments conducted by other nations. Besides the American steamship "Mercer" a British vessel has spanned the Atlantic and it is understood that the British government contemplates appropriating nearly a half million dollars soon to carry on further research under the auspices of the British Department of Scientific and Industrial Research.

TWO especially interesting papers were presented at a special session on the economic possibilities in the better co-ordination of fuel utilization. The first of these, entitled "A Fuel Policy," by Sir Arthur Duckham, although written particularly with English conditions in mind, is well worthy of close study by the American coal industry. The second paper, by the famous French scientist, M. Berthelot, bore the title "Co-ordination Between Blast Furnaces, Coke Ovens and Martin Furnaces in the Metallurgical World." Outstanding points raised in these two papers were:

(1) The thermal and economical advantages of grouping coke ovens, blast furnaces and steel works.

(2) The effect of modern coke oven practice upon the prosperity of the iron and steel trade.

(3) The significance of cleaning and blending coals, with particular relation to the economics of iron smelting.

(4) The desirability of instituting investigation into the possibilities of large scale distribution of coke oven gas in Great Britain.

(5) The economics of power raising in a steel plant.

(6) The effect of transport charges on fuel economics.

On every hand and in every language among coal-producing nations of the world one hears mention of the coming American International Fuel Conference to be held in Pittsburgh in November. Apparently not a small portion of the delegates to the London conference will be present.

Institute Hard-Coal Research

Prominent educators, engineers and anthracite operators held a conference at Lehigh University, Bethlehem, Pa., Sept. 21, on research problems of the anthracite industry. A committee consisting of President Richards of Lehigh University; Dr. S. W. Parr, University of Illinois; Henry Kreisinger, Combustion Engineering Corporation, and A. C. Fieldner, U. S. Bureau of Mines, recommended the organization of a bureau to co-ordinate such investigations.

The inquiry would be along three principal lines, that of production, utilization and purely scientific. Under the head of utilization would be included improvement of household devices and an effort to make the burning of anthracite in the domestic heating plant more automatic.

West Virginia Observes Its Greatest Annual Safety Day

SEVERAL thousand were in attendance at Bluefield College athletic field Saturday, Sept. 22, when West Virginia Safety Day was celebrated at Bluefield, the eastern gateway to the Pocahontas field. This third annual observance, at which 180 teams competed for first-aid trophies, eloquently portrayed the interest in safety betterment which Robert M. Lambie, chief of the West Virginia Department of Mines, has kindled among the operators of that state.

The presence of many prominent coal men, so often scarce at first-aid meets, gave the affair the air of an operators' convention. Governor Gore, who addressed the assemblage before the contest began, was to be seen frequently during the day and evening mingling with the coal men.

For the first time the contest included a competition for colored teams. Twenty-seven of these teams took part. Also there was a class for Boy Scout teams.

First prize for white miners was awarded to the team from No. 86 mine of the Consolidation Coal Co., Carolina, in the northern part of the state. Other awards, in order, were as follows: Booth mine, River Seam Coal Co., Fairmont; Fordson Coal Co., Twin Branch; No. 1 mine, Cranberry Fuel Co., Cranberry; No. 6 mine, United States Coal & Coke Co., Gary; Island Creek Coal Co., Holden, and Rock Lick Smokeless Coal Co., Concho.

The prize to colored teams went to that from the Lake Superior Coal Co., near Welch, and second to the Grant Town team of the New England Fuel & Transportation Co. Prizes to these colored teams consisted of individual cups given by the West Virginia Coal Association. Walter Cunningham, secretary of the association, announced the winners and awarded all prizes for the meet.

First prize in the Boy Scout competition was won by the McComas team of the American Coal Co., second by a team from Morgantown, and third by the Sharples team of the Boone County Coal Corporation. Awards to the boys consisted of cash.

Awards to the first three white teams consisted of sets of six 14-in., 12-in. and 8-in. cups, also banners, given by the state. The National Coal Association gave cups to the fourth team and the National Safety Council awarded bronze medals to the fifth team. The sixth team received bronze medals from the American Red Cross. Silver medals of the National Safety Council went to the seventh team.

In addition to Governor Gore, speakers of the day were J. G. Bradley, president of the Elk River Coal & Lumber Co., Harry Gandy, executive secretary of the National Coal Association, and John M. Carmody, editor of *Coal Age*. Col. W. S. Battle, Jr., vice-president of the Norfolk & Western Ry., which in 1926 was awarded the Harriman Memorial Gold Medal for safety, presided at the speakers' platform.

Mr. Bradley called attention to the fact that fatalities in 1927 were confined to 28 per cent of the mines, and he urged effort to get more mines out of that class. Mr. Gandy said that safety work in West Virginia reduced the fatalities per million tons to 3.96 during the years 1925, 1926 and 1927 as compared to 4.53 in 1922, 1923 and 1924. Mr. Carmody said that the full co-operation so necessary in safety work calls for more consideration and respect for the other fellow. All speakers praised the accomplishments of Chief Lambie.

Capt. P. L. Hay, chief engineer of the Safety in Mines Research Board of Great Britain, closed the switch which set off a coal-dust blast in a wooden gallery arranged by the U. S. Bureau of Mines.

At the close of the day after the team awards had been made, J. J. Forbes, of Pittsburgh, representing the U. S. Bureau of Mines, awarded the "Sentinels of Safety" trophy to the Gary No. 2 mine of the United States Coal & Coke Co. This trophy, presented by the *Explosives Engineer*, was accepted by W. J. Kearns, superintendent of the mine, in the absence of Col. Edward O'Toole, general superintendent.

The meet was a big undertaking and the crowd taxed the hotel space in Bluefield and vicinity to the limit. Direction of the entire affair was handled by Robert Lilly, state mine inspector from Mount Hope. Hs was assisted by W. E. E. Koepler, secretary of the Pocahontas Operators' Association.

At the close of the tournament Chief Lambie expressed his appreciation of the meet in part as follows:

"It would be ungrateful if I failed to thank the operators of the Pocahontas district for their substantial contribution to this event. Without them we could not have succeeded, for State Safety Day is a voluntary manifestation of the interest of a great industry in accident prevention work. Operators in the other districts have supported this annual observance since it was instituted and they have our continued appreciation.

"You men of the mines who have come here from the immediate sections and the uttermost districts of the state are the peers of any gathering of men that I have ever witnessed. Your desire and your aim, through the study of first-aid practices, to relieve human distress and to save human life, is the most commendable object of life. Many of you have made sacrifices to be here, and from the bottom of my heart I thank you for your presence.

"I cherish the hope that these growing annual demonstrations of safety interest will bring us together in even greater force in the following year."

Smokeless Merger Plan Falls Through

The executive committee which for some months past has been working to bring about a merger of coal properties in the smokeless field of southern West Virginia decided, at a meeting held in New York Sept. 26, to abandon its efforts to effect a consolidation. Isaac T. Mann, president of the Pocahontas Fuel Co. and chairman of the committee, made the announcement that the plan had been dropped because of failure to obtain the consent of companies representing the total tonnage contemplated in the proposed consolidation.

Plans for the merger had been made conditional on obtaining consent to enter the consolidation from companies representing at least thirty million net tons of annual production. The committee was unable to obtain the co-operation of sufficient companies to meet this requirement.

A Portion of the Field With Teams in Action

Personal Notes

DONALD MARKLE, of Hazleton, Pa., who has been president of the Fuel Service Co., Inc., 17 Battery Place, New York City, since its organization in 1924, was elected chairman of the board of that company at a meeting of the directors and stockholders held in the New York office on Sept. 25. Mr. Markle was succeeded in the presidency by Arthur L. Zerbey, who has been vice-president of the company since 1924.

GEORGE BAUSEWINE, recently Western manager of the Norfolk & Chesapeake Coal Co., has been appointed general manager of that company with headquarters at Detroit, Mich.

ROBERT A. QUIN and David V. Randall, newly appointed vice-president and general manager, respectively, of the Susquehanna Collieries Co. and the Lytel Coal Co., were formally welcomed at a dinner Sept. 21 at the Irem Country Club, Wilkes-Barre, Pa. The affair was arranged by employees of the Wilkes-Barre office and the seven superintendents of the companies.

Obituary

HENRY S. LYONS, 63, a conspicuous figure in the financial and industrial affairs of New England and in recent years prominent in the bituminous coal trade, died suddenly from pneumonia in New York City Sept 21. He was vice-president of the Massachusetts Gas Cos.; president, Mystic Steamship Co.; vice-president, New England Fuel & Transportation Co.; president, Federal Coal & Coke Co.; secretary, New England Coal & Coke Co.; Castner, Curran & Bullitt, Inc.; C. C. B. Smokeless Coal Co. and the Boston Consolidated Gas Co.

DANIEL MARQUIS, aged 60 years, owner of a coal mine at Rushville, Ill., was killed by carbon monoxide gas in the coal mine Sept. 13.

Coming Meetings

American Management Association. Autumn convention, Nov. 13-15, Palmer House, Chicago, Ill.

National Coal Association. Eleventh annual meeting, Nov. 14-16, Cleveland Hotel, Cleveland, Ohio.

Second International Conference on Bituminous Coal, Carnegie Institute of Technology, Pittsburgh, Pa., during week of Nov. 19.

Seventh National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York City, Dec. 3-8.

American Mining Congress. Thirty-first annual meeting, Dec. 5-8 inclusive, Mayflower Hotel, Washington, D. C.

Coal Mining Institute of America. Annual meeting, Dec. 12, 13 and 14, at Pittsburgh, Pa.

Harlan County Coal Operators' Association. Annual meeting at Harlan, Ky., Nov. 21.

Southern Appalachian Coal Operators' Association. Annual meeting, Dec. 7, at Knoxville, Tenn.

Iowa Coal Operators' Association. Annual meeting at Des Moines, Iowa, Dec. 11.

Edward J. Mehren

Vice-president and editorial director of the McGraw-Hill Publishing Co., who has been appointed editor of the "Magazine of Business," which recently came under McGraw-Hill control through the consolidation of that organization and the A. W. Shaw Co., of Chicago. He retains the above official positions.

State Electrical Inspectors To Examine Mines

Appointment of four practical electricians to inspect electrically operated portable equipment in gaseous mines in the Pennsylvania bituminous coal districts has been recommended to Governor Fisher by the State Department of Mines. These inspectors will work under the direction of and report to state mine inspectors. The four electrical men will cover the 30 bituminous districts, moving from one district to another as their work is completed. The headquarters of the electrical corps will be at Pittsburgh, Greensburg, Johnstown and Uniontown.

The inspectors, whose names have not been announced pending confirmation of their appointment by the Governor, will begin work this month. They have been taking a special course of training in the laboratory and experiment test rooms of the U. S. Bureau of Mines station at Pittsburgh. The appointment of the electrical inspectors is the aftermath of five explosions last February in which the primary cause of the catastrophe in each instance was the ignition of gas in portions of the mine where electrical equipment was being used.

Ramsay Has Birthday Party

Friends and relatives numbering approximately 2,600 took part in a celebration of the 64th birthday of Erskine Ramsay at his home in Birmingham, Ala., Sept. 25. A large number of out-of-town friends joined local admirers in doing honor to Mr. Ramsay, who as chairman of the board of the Alabama Byproducts Corporation, moving spirit in various other industrial enterprises and philanthropist, has long been prominent in the civic and social life of Birmingham. He was born Sept. 24, 1864, near Pittsburgh, Pa., and went to Birmingham when he was 22 years old.

Wearing in his coal lapel a sprig of heather, the emblem of his Scottish ancestors, Mr. Ramsay was showered with congratulations by the assembled guests. There was a large pink and white birthday cake surmounted with one large lighted candle. Mrs. Morris W. Bush, wife of the president of the Alabama By Products Corporation, cut the cake. "Think of one girl when you blow out the candle," she admonished Mr. Ramsay. He is a bachelor.

An old-fashioned barbecue was served on the grounds of the estate early in the evening. Music was furnished by the Boys' Industrial Band, the Firemen's Band and Drummond Liedell, who, dressed in kilts, played a bagpipe. There was dancing in the pavilion adjoining the house until a late hour.

'Twas a Braw Affair on Mr. Ramsay's Sixty-Fourth

Second National Fuels Conference Discusses Combustion Problems And Efficient Coal Preparation

PRACTICAL problems of fuel consumption as affected by furnace design and equipment, efficient combustion methods and proper coal preparation were discussed at the second National Fuels Meeting held under the auspices of the fuels division of A.S.M.E at the Hotel Cleveland, Cleveland, Ohio, Sept. 17-20. Research also came in for attention and the delegates were asked to support a comprehensive program of investigation under government auspices.

The greatest field for improvement in combustion processes is in the domestic furnace, declared Victor J. Azbe, chairman of the division, in formally opening the sessions. Too many engineers, he said, take smoke waste and its attendant atmospheric pollution as a matter of course. Boiler efficiencies must be raised and smokelessness made the goal.

Research, remarked Thomas S. Baker, president, Carnegie Institute of Technology, is a curse to those who do not use it and a blessing to those who do. The coal industry has suffered serious loss because of the advances in economical consumption made by the users of fuel. This economy "has done a temporary disservice to the coal operator who is baffled by what is taking place around him. Research to him at the present time is anything but a benediction."

Nevertheless it is to research that the industry must turn for help. Research, he continued, can be employed to enlarge the markets for coal and increase the opportunities for profitable utilization. He admitted that he could not see just how science was going to cure the ills of the industry which cannot be banished "by magic," but he was confident that science could help.

Dr. Baker suggested that research work be undertaken as a group activity by the coal operators with research laboratories and fellows at a number of universities properly equipped to carry on experimental investigations. Group action, he pointed out, would reduce overlapping and prevent duplication of research activities. Such a movement adequately financed also would pave the way for the training of an increasing number of fuel technicians.

The aims of the coal classification committee of the American Engineering Standards Committee were outlined Monday afternoon by A. C. Fieldner, chief chemist, U. S. Bureau of Mines, and chairman of the coal classification committee. This sectional committee, he explained, was keeping the following considerations in mind:

(1) That coal should be classified primarily on the basis of its intrinsic chemical and physical properties. These properties involve the origin, composition and constitution of coal.

(2) That use classification should be secondary to the scientific classification and should be correlated with the scientific classification as far as possible.

(3) That scientific classification depends on two primary factors—the composition and type of the original coal-forming vegetation, and the degree of metamorphism or coalification of the vegetable residue.

(4) The first factor is described broadly in the type of coal, as xyloid, canneloid or boghead; the second factor is the progressive rank from lignite to anthracite.

(5) The criteria to be considered for classifying under these two general factors are proximate and ultimate analyses, calorific values, microscopic examination, extraction with solvents, reaction with reagents and destructive distillation.

A question was asked whether any attempt would be made to decide what was a good coking coal. Mr. Fieldner replied that the classification would give a line on that and cited studies of the Koppers Co. along the line of preclassification of coking values of fuels before actual tests. He felt sure that the work of the committee would furnish the basis for a "good scientific guess."

W. G. Stephan, Stephan Co., remarked that the use classification basis suggested that the fusing point of ash was of tremendous importance. George C. Squier, Rochester & Pittsburgh Coal & Iron Co., wanted to know what practical value the work of the committee would have. His company was trying to make a tailor-made product. How could it use the proposed classification in its selling?

Mr. Fieldner answered that great confusion now exists because coal is classified in 25 to 30 different ways, such as Pittsburgh, Second Pool, smokeless, byproduct, etc. The classification under discussion would provide a common language for the broad features so that buyer and seller would understand each other. No attempt to destroy the value of trade and district nomenclature was contemplated. He believed it would be possible to merchandise coal by classes when the new classification was understood.

S. B. Flagg, a member of the Fieldner committee, stated that it was the hope of the committee that by study of the fundamental characteristics it would be possible to tell in advance how coals possessing certain characteristics would behave under certain conditions. The present use classifications were based upon past experience. One of the big problems, said P. G. Estep, is to have use classifications draw a sharp distinction between grade and rank.

Morgan Smith, General Motors Corporation, wanted to know whether industry at large had been canvassed to find out what classifications different buyers use. What weight would be given to evaporation, extra labor due to clinkering, maximum loads. More use data were needed now. N. Silverman, Boston & Maine R.R., believed that when all the data had been collected the committee would find that as a practical matter the chemical content of the coal was secondary to the physical make-up of the fuel.

The burning characteristics of different types of fuel, particularly with reference to combustion as pulverized fuel, were discussed in a paper by Henry Kreisinger and J. Cross, Combustion Engineering Corporation. Rhode Island coal, the paper stated, could not be burned alone in powdered form; Pennsylvania anthracite is hard to ignite. The Eastern low-volatiles can be burned readily as pulverized in powdered form although there is a greater stack loss of combustible with Pocahontas than with bituminous coals.

Pittsburgh district coals do not pulverize easily but when powdered burn with a long, luminous flame and show a comparatively small stack loss of combustible matter. Except when containing an excessive amount of pyrites Illinois coal pulverizes more easily than the harder-structure coals of the Appalachian Region but not as readily as Pocahontas. It burns with a long, luminous flame and the flue dust carries only a small percentage of unburned coke. Western sub-bituminous coals pulverize easily and complete combustion is readily obtainable when burned in powdered form. Lignite with moisture content reduced to 28 per cent also makes an acceptable pulverized fuel which readily gives complete combustion.

A brief review of coal-washing and cleaning processes and their applications to different ranks of coal was presented by H. D. Smith, assistant to the president, Ashland Coal & Coke Co. "From an operating standpoint the cost of cleaning coal is made up of the four factors of power, labor, maintenance, and overhead, which latter includes depreciation and investment costs. An indirect cost in cleaning coal is the loss due to rejecting the waste and the 'bank' loss in good coal which goes with the rejects through not being able to obtain a 100 per cent efficient cleaning plant. These are sometimes called conversion costs. As an example, a mine may be running 2,000 net tons per day with a cost of $1.75 per ton in the railroad car. Should that mine put in a cleaning plant and remove 10 per cent by weight of rejects, the cost of mining would be $3,500 and only 1,800 net tons would be shipped, making the cost $1.95 per ton, or 20c. per ton conversion cost. If the operating cost for power, labor, maintenance and overhead is 20c., a low figure for a large washing plant, this would give a total cost of 40c. for the cleaning process. This cost will vary with different types of plants, also ac-

cording to size and capacity, type of coal being treated and whether the coal has to be dried after washing. The washing costs on bituminous coals will run from 20 to 40c. per ton, but if the 'last pound of flesh' is required these costs may jump to 40 to 80c. per ton on some coals, the bank loss and conversion costs being the largest factors.

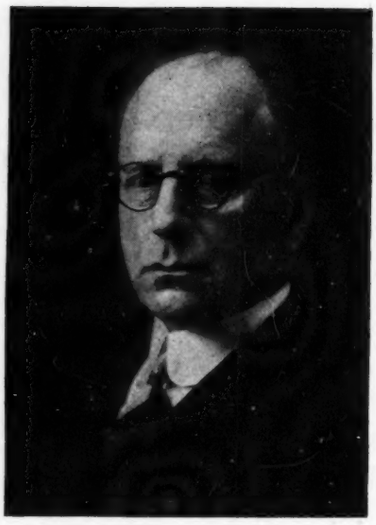
"It is possible on a certain coal to make a complete study of the cleaning possibilities, the effect on the coal of ash reduction, to determine what it would cost per ton to clean from a feed ash of, say, 10 per cent to a clean product having 6, 6½, 7, and 7½ per cent ash and so on, and what effect the cleaning would have on the quality. If the use of the coal and the price that could be obtained after cleaning were learned, then it could be determined if it would pay to clean to 6 or 7 per cent or to just where the economic point would be. It would be very difficult to so construct a plant whereby the ash content in the cleaned coal could be varied with the price received, and although this could be done, it would not work out commercially, for after it was found that a certain plant could turn out a 6 per cent ash coal on a fair market price, that plant would still be required to furnish a 6 per cent ash coal by its consumers even on a market price which was below its cost of production and preparation."

Wm. Morgan, Pittsburgh Coal Co., described the results obtained from air-cleaning an average of 2,200 tons per day over a period of 18 months. The average ash content of the raw coal treated was 10 per cent. In the powdered coal turned out the ash content was down to 7.7 per cent; in stoke coal, to 7.1, and in stove stoker and stove coal, to 7.1 per cent. The increased realizations received on the cleaned coal convinced the speaker that there is a market for such fuel which will pay the extra costs of preparation.

Cleaning increased the calorific value 150 B.t.u. This increase and the 3 per cent reduction in ash meant a real increase in efficiency in the boiler room because there was a lower percentage of unburned carbon in the ash pit and stack losses were reduced with a gain of 2 to 7 per cent in over-all efficiency.

In answering questions on wet cleaning Mr. Smith stated that the experience in the Pocahontas field had been there was no real gain in attempting to wash coal minus 48 mesh. Some trials had been made with sludge tanks but better results had been obtained by bypassing minus ¼ or minus ⅜-in. coal. He found the minus 48 mesh had 5 per cent free ash. Dry-cleaning was recommended for such coal.

With Kentucky and West Virginia high-volatile nut, pea and slack offered on the Detroit market at 35c.@$1, how much can you expect in the way of preparation? asked Morgan Smith. Nobody answered his question directly, but Mr. Squier countered with "why be in the slack business" when a market can be built up for specially prepared stoker and powdered coal?



William H. Coverdale

Elected president of the Gulf States Steel Co., Birmingham, Ala., succeeding the late James Bowron. Mr. Coverdale is a member of the consulting engineering firm of Coverdale & Colpitts, New York City, and has been associated with the Gulf States company since 1913 as consulting engineer and a director. John W. Platten, who has been chairman of the finance committee, has been named to succeed Mr. Bowron as chairman of the board, and Lester E. Geohegan, for several years vice-president and general manager, has been made a director.

At the general session Tuesday afternoon a paper on "Possible Avenues of Productive Research in Coal," by F. R. Wadleigh, was read. Although interest and activity in the study of coal and its possibilities were at a high point the work lacked co-ordination and continuity. Mr. Wadleigh advocated a "definite, systematic, far-reaching and inclusive research plan under competent direction and adequately financed over a definite period of years."

Government bureaus which should have taken the leadership are doing less actual coal research work than they did before the war because they are handicapped by a lack of funds, said Mr. Wadleigh. An attempt will be made to remove this handicap by requesting Congress "to add $1,000,000 to the Bureau of Mines appropriation for the next five years for specified coal research work." Mr. Wadleigh urged that the A.S.M.E. and other societies and individuals interested in coal support this campaign.

Mr. Wadleigh divided the field of coal research into five main divisions: (1) Formation and accurrence of coal; (2) constitution of coal; (3) production; (4) utilization; (5) economic of coal. "No one of our principal industries," he said, "needs thorough, intelligent and effective research so much as coal."

A special session devoted to powdered fuel was held on Tuesday afternoon and the pulverized-coal question also came up for treatment at later sessions of the marine and central station sections.

J. M. Clark, Southern Pacific Ry., presented the advantages of oil as a locomotive fuel and urged conservation to delay the inevitable day when all railroads must again rely upon coal. It was agreed in the discussion following the summarization of the paper by the author that whether a railroad used oil or coal was largely a question of nearness of supply and price. In some cases, as J. G. Crawford, Chicago, Burlington & Quincy R.R., pointed out, commercial traffic considerations also enter into the picture.

Mr. Rausch, Superheater Co., emphasized the possibilities of economy in the use of low-grade solid fuel. The International Great Northern, he said, had changed from oil to coal and saved 34 per cent in its fuel bill. The Texas & Pacific, burning lignite under forced draft, had saved 40 per cent.

Malcolm MacFarlane, New York Central Lines, outlined briefly the inspection system which is the basis of the selection of coal by that railroad. This system was described in detail by Mr. MacFarlane in an article in the July, 1927, issue of *Coal Age*. The speaker also called attention to the great strides made in fuel economy. In freight service every month in 1927 broke a record, "with the lowest, meaning the best, fuel performance of any corresponding month in any year. For the year the average was 131 lb. per 1,000 gross ton-miles compared with 137 lb. in 1926 and 140 lb. in 1925. The low figure of 118 lb. per 1,000 gross ton-miles reported for July and August was the best record of any one month in railroad history."

In passenger-train service new records in conservation also were established. "The average amount of fuel consumed per passenger train car-mile was 15.4 lb. during 1927, compared with 15.8 lb. in 1926 and 16.1 lb. in 1925. The low record for a single month was reached in July, 1927, with an average of 14 lb. per car-mile.

"These savings in the use of fuel per unit of traffic, in the freight and passenger services combined, meant a saving in aggregate locomotive fuel consumption, during the year 1927 as compared with 1926, of more than 4,450,000 net tons."

W. J. Overmire, Cleveland, Cincinnati, Chicago & St. Louis Ry., also emphasized the records in progressive fuel conservation and outlined how these records were being obtained by proper supervision of railroad personnel, selection of coal and handling through coaling stations.

Mr. Crawford, who was head of the committee which made the original tests at the University of Illinois several years ago, discussed "Relative Values of Different Sizes of the Same Fuel in Locomotive Service" as developed in recent studies by different railroads. In 1914, he said, 4 roads out of 71 with 2,000 locomotives out of a total of 51,000 in service on class 1 railroads had made such tests; in 1928 reports had been received from 10 out of 45 roads with 12,000 out of 51,000 locomotives.

The closing sessions of the meeting, held on Thursday, were devoted to a discussion of smoke abatement work.

Safety Council Glimpses Secrets Of Success in Accident Prevention

MEANS of inducing the mine workers to realize the value of safety to themselves and their families formed the main subject of the sessions of the Mining Section of the National Safety Council at the annual congress of the latter, Oct. 1-5 held in New York City. The coal and metal mining men held their meeting at the Waldorf-Astoria.

C. A. McDowell, safety and personnel manager, Pittsburgh Coal Co., Pittsburgh, Pa., as chairman of the section, presided. R. M. Lambie, chief inspector of the State of West Virginia, Charleston, W. Va., addressed the meeting on the subject "Safety Pays." Mr. Lambie regretted that the narrow margins in the operation of coal mines and the losses many operators sustained in working their properties had caused them to attempt to reduce the supervisory forces so necessary for successful safety work. The economies proved fallacious, for safety pays large dividends and cannot be attained without a proper expenditure for a safety staff. The accident rate for a while increased because of these economies.

Consequently, in 1920, the state safety campaign was started that culminated this year in a safety meet at Bluefield, W. Va., at which 23,000 gathered and 180 teams took part. It was marked by great enthusiasm for increased safety even more than by the large numbers present. Before the campaign started one life was lost for 175,000 tons mined. Last year, for each life sacrificed, 254,000 tons was produced. During the present year for each fatality 360,000 tons has been mined, proving that the effort has been fully justified.

THERE are now 500 safety clubs with memberships ranging from 10 to 400 persons. The formation of these clubs has done much to advance safety. At their sessions fines are imposed ranging from 50c. to $1 for violations of safety rules. Small as these payments are they have a deterrent effect when they are levied on men by their fellow workmen sitting in council. These safety courts were initiated in West Virginia by the Island Creek Coal Co. The safety movement has saved $900,000 to the operators and far more to the mine workers of that state.

Mr. Lambie advocated the extension of Safety Day throughout the United States because it gives the movement solemnity and creates a sentiment for safety in operation that no other means can afford. The state has appropriated $5,000 for the Safety Day celebration, and it is purposed to extend the movement to all the industries of the state, so helpful has it proved to the mining industry.

W. D. Brennan, Stag Canyon Branch, Phelps Dodge Corporation, Dawson, N. M., said that he found safe operation paid dividends in cash as well as in lives and happiness. The cost for compensation at his mines had dropped from 5c. to 3c. per ton as a result of activity in promoting safety. F. S. Lenhart, W. J. Rainey, Inc., said that the mine which had the best safety record was recognized by his company by sending the official to the annual congress of the National Safety Council.

H. G. Hensel, Youngstown Sheet & Tube Co., Youngstown, Ohio, said that one of the foremen had complained that a careful record was made of the hazards which they allowed to exist in their mines and of the accidents that occurred, but that no record was made of the good work they were doing in the removal of such hazards from day to day. So the company ordered that a daily report be made of all unsafe practices corrected by foremen. If a foreman did not report that he was correcting hazards such as the safety men were continually finding uncorrected in his mines, it was regarded by the safety committee as evidence that he was indifferent about such hazards and was not actively promoting safety.

H. S. Gilbertson, director of personnel, Lehigh Coal & Navigation Co., Lansford, Pa., spoke on "Methods and Results of Improved Foremanship Conferences." He said that the purpose of personnel management was to make those in a corporation who were thinking in different ways think in unison and to agree as to the right end to be sought and the right way to attain that end. The company published a paper for its employees in which it gave them information as to its problems and profits.

UNFORTUNATELY, in the early days the direction and sole responsibility of a mine was in the hands of a contractor. Afterward the contractors were replaced by foremen, but these company officials were given equal authority with the contractors they displaced. The foreman, consequently, regarded his methods of operation as his private matter. True the company had a right within limits to have the coal produced at a reasonable figure, but how it was produced was a matter which the company, in his opinion, had no right either to question or regulate. He was master in his own sphere, and it always was his practice to be secretive and to resent any inquiry as to his actions.

The Lehigh Coal & Navigation Co. had endeavored to show the foreman how his duties could be performed so as to give the best results as to economy, safety and amicable relations with the mine workers. Some foremen had been found who had developed little ability to analyze their jobs or to delegate their functions to others so as to have the work continually under supervision. Moreover, they did not provide for "having the stage set" for economical production. They preferred to meet unfortunate situations as they arose, to correct what they found amiss rather than to provide that the unfortunate situations could not arise and would not need correction. This was the purpose of the foremen's conferences.

Cleveland E. Dodge, vice-president, Phelps Dodge Corporation, New York City, delivered an address on "Educating the Miner in Safety," in which he stated that the officials of his company had discovered some years back that their safety work effected only a certain degree of safety and was not progressing beyond a certain unsatisfactory level. Seeing how much the record of the United States Steel Corporation had excelled theirs they decided to make an inquiry into the work of that company to find what was the secret of its success.

THEY declared, after the study had been made, that the progress of the steel company was to be ascribed to an enthusiasm for the safety campaign throughout the organization from Judge Gary down to the worker at the face. With that as a basis the Phelps Dodge officials reorganized the safety work, making it not merely the function of special safety men, but an immediate interest of every official in the organization. Gratifying results immediately followed, as the figures for the various plants showed. Accidents steadily decreased.

Mr. Dodge presented the figures in the accompanying table:

	Number of Lost Time Accidents	Rate per Thousand Man-Shifts
Copper Queen, Moctezuma and Morenci		
1924	2,386	1.047
1928 (6 months)	82	0.072
Coal Mines at Dawson		
1924	443	1.656
1928 (6 months)	64	0.482
Nacozari		
1926	86	0.153
1927	37	0.062

Frank Ayer, Phelps Dodge Corporation, Morenci, Ariz., said that safety enthusiasm emanated from 99 John Street, New York City, to the Western manager and thence to all the minor officials and to the workers in the mine. Committees were formed not for the mine alone, but for every division in the mine. Inspections were made twice every month at unexpected periods, the date being arbitrarily and quietly fixed by the manager and safety engineer, who alone knew when the visits were to be made.

The latter accompanied the men in their tour of the mine and acted as secretary, recording all the dangerous conditions they found and making a report which was kept for an indefinite period. As the inspection was unexpected, window dressing was impossible. The company endeavors to take advantage of every suggestion offered. It has a willing mind and not merely an open one. Men "get a great kick" out of having their suggestions accepted.

Mr. Dodge said that the safety work had improved discipline, and discipline had lowered costs and increased production. The results, said Mr. Ayer, had been attained despite bad roof condi-

Mr. Brennan said that at the coal mines of the Phelps Dodge company no effort was made to compel the miners to wear shoes with safety toe caps until the officials had full assurance that the miners realized their value in reducing accidents. Now that the company felt satisfied that the men in general were convinced that the shoes would save toes a ruling had been made that any man who appeared in a new pair of shoes at the mine would not be allowed to enter it unless the shoes had the required safety features. Thus the men were permitted to get the full value out of their old equipment. Soon, however, every man would be properly fitted, and the rule would be made binding without exception.

Mr. Ayer said that the failure of shoes to protect all the toes, including the little toe, was an objection to most safety shoes. The Chippewa had the advantage of protecting all the tarsi. The Hamilton, Brown Co. shoe had been giving ample protection to all the toes which its safety cap covered.

MEN wearing these shoes had been bruised by the mine floor when weights fell on their toe caps yet had been protected by the cap from the immediate effects of the blow on the top of the shoe. Someone had invented a spat made of canvas with some stiff protective material that prevented injury to the instep yet did not in any undue degree interfere with the movements of the wearer.

After several excellent musical selections rendered by B. F. Tillson, his wife and four children, S. P. Howell, explosives engineer, U. S. Bureau of Mines, Pittsburgh, Pa., gave an address on "Safe Handling of Explosives Underground." He called attention to the advantages of short-circuiting detonators by shunts or by twisting the legs of the detonators together, but, he said, these devices were rendered of no avail if the miners did not understand the purpose of the short-circuiting and untwisted the legs long before the time at which the shots were to be fired. The management should explain why the legs were short-circuited and should prescribe the time when the detonators should be "unshorted."

He said that firing cables should be of stranded wire so as to be flexible and should be rubber-covered. They should be made of No. 16 wire and at least 100 ft. long. When it became necessary to splice them the splices should be taped and staggered. Several kinds of explosives should not be used in one mine, though sometimes it may seem advisable to use different explosives for coal and for rock. It would be better, however, to use the same explosive for both materials. Smoking should be forbidden as it is liable to ignite detonators and explosives.

The committee on nominations named George Martinson, Pickands-Mather Co., Hibbing, Minn., as chairman; A. W. Dickinson, Union Pacific Coal Co., Rock Springs, Wyo., as first vice-chairman; J. P. Hodgson, Phelps Dodge Corporation, Bisbee, Ariz., as second vice-chairman; F. C. Miller, Colorado Fuel & Iron Co., Trinidad, Colo., as third vice-chairman; R. N. Hosler, superintendent, Pennsylvania Compensation Rating and Inspection Bureau, Coal Mine Section, Harrisburg, Pa., as fourth vice-chairman, and Dan Harrington as secretary. The nominations were unanimously approved.

At the luncheon which followed the band of the Safety Club of the New Jersey Zinc Co., consisting of 37 boys and girls, provided the music, the members joining in community singing led by N. V. B. Zeigler, personnel director, U. S. Aluminum Co., New Kensington, Pa.; an address was delivered by John M. Carmody, editor, *Coal Age*, and entertainment was afforded by J. P. McGinnis, demonstrator, E. I. duPont de Nemours Co.

Mr. Carmody stressed the importance of safety work beginning at the top and urged patience in introducing new safety features, saying that it was the natural impulse of every man to oppose direction until he realized its reasonableness and value. Equipment and technique were all very well, but success could be attained only by a dominant personality and the kind of leadership that is founded on winning the full confidence, respect and affection of the men.

New Permissible Plates By Bureau of Mines

The following approvals of permissible mining equipment have been issued by the U. S. Bureau of Mines since July 1, 1928:

Loading Machines and Conveyors

(1) "Face Loader"; Crocker-Wheeler 22-hp. motor, 250 volts, d.c.; approval 155, Bethlehem Steel Co., Aug. 2, 1928.

(2) "Car Filler"; Crocker-Wheeler 25-hp. motor, 250 volts, d.c.; approval 156, Bethlehem Steel Co., Aug. 2, 1928.

Coal Drills

(1) Model A drill; 1½-2-hp. motor, 250 volts, d.c.; approval 154; Ohio Brass Co., Aug. 2, 1928.

Mining Machines

(1) Type 35-BB mining machine; Jeffrey 50-hp. motor, 220-440 volts, a.c.; approvals 153 and 153A; Jeffrey Mfg. Co., Aug. 1, 1928.

Mine Pumps

(1) Dravo-Doyle mine pump; Type Austin 4x5; General Electric 3-hp. motor and control, 230 volts, d.c.; approval 157; General Electric Co., Aug. 23, 1928.

(2) Dravo-Doyle mine pump; Type Austin 5x6; General Electric 5-hp. motor and control, 230-500 volts, d.c.; approvals 158 and 158A; General Electric Co., Aug. 27, 1928.

Electric Hand and Trip Lamps

(1) Super-Wheat hand lamp; approval 1004; Koehler Mfg. Co., Inc., July 19, 1928.

(2) Super-Wheat Stevedore lamp; approval 1005; Koehler Mfg. Co., Inc., Aug. 3, 1928.

Portable Air Compressors

(1) Type 20 air compressor; Westinghouse 15 hp. motor and control, 250-500 volts, d.c.; approvals 159 and 159A; Ingersoll-Rand Co., Sept. 4, 1928.

(2) Type WK-22 air compressor, 30 hp. motor, 250-500 volts, d.c.; approvals 160 and 160A; Sullivan Machinery Co., Sept. 10, 1928.

A complete list of permissible equipment for which approvals were issued prior to July 1, 1928, was published in the preceding issue of *Coal Age*.

IN AN address on "metal-mine fires," Daniel Harrington, chief engineer, Safety Division, U. S. Bureau of Mines, remarked that fire in mines was increasing the toll of life and economic waste. and added that electricity was causing many mine fires and resultant fatalities in coal mines. Of 29 coal mine fires, 14, causing 282 deaths, were from this cause; 10, causing 48 deaths, were from open lights; 3, causing 9 deaths, were from explosives, and 2, causing 2 deaths, were from unknown causes. Thus 29 fires caused 341 deaths.

"No repair parts can be provided for the human being," said E. H. Suender, general manager, anthracite operations, Madeira-Hill Co., Frackville, Pa. Accidents, figuring each life at $5,000, eat up no less than 3 per cent of the $40,000,000,000 wage that American wage-earners receive, a truly large item in the national budget, Mr. Suender said in his address, which bore the title "Management Believes in Accident Prevention." No manager can fail to feel the utmost responsibility for this loss which bears heavily on both employee and employer, especially the former. In the promotion of safety, good will is necessary between the foreman and the mine worker, and the best way a foreman can acquire good will is by spreading it among his men.

THE anthracite region was one of the earliest industries to interest itself in safety. State inspection and regulation of industry had its origin in that region, and a big improvement in safety was made in the early history of the industry. Nor must it be forgotten that in 1901 before safety or the care of those injured in industry had made any progress W. J. Richards, then general manager of the Philadelphia & Reading Coal & Iron Co., definitely organized first aid at his mines.

Everard Leland, general superintendent, Moctezuma Copper Co., remarked that his company had recently decreed that after 60 days every man must pass an examination in the safety rules adopted for the guidance of the employees or leave its service.

Mr. Hosler declared that almost every accident was a potential death and should be so regarded. Mr. McDowell said that the Pittsburgh Coal Co. had established what he believed was a precedent—it had employed a welfare worker for its negro employees. He was a college-bred man and had been five years in charge of a negro community house. Mr. McDowell's experience was that the colored men take better care of their lives and limbs than white men under similar working conditions.

Mr. Berry said that the Bethlehem Mines Corporation is endeavoring to reach the family with the safety message. The children in the schools write essays about the mining laws and about the safety recommendations they see on the bulletin boards.

Washington Letter

By Paul Wooton
Special Correspondent

ELOQUENT of the difficult conditions in 1927 is the Bureau of Mines' annual report on operations in that year. Pennsylvania, long the unchallenged leader in the bituminous industry, dropped to second place. West Virginia displaced its rival by a good 12,000,000 tons. The upset was partly due to the strike which hampered production in Pennsylvania, while at the same time it threw added business to West Virginia.

For the same causes Kentucky, with 69,000,000 tons, exceeded the output of Illinois and Indiana combined. Ohio, also affected by the strike, produced less coal than single counties in West Virginia.

Most significant of the trends shown in the report is the steady decline in the importance of the small mine and the concentration of business in the larger properties. The high mortality which killed off more than 2,300 mines was confined to those in the smaller sized classes. The number of class 1 mines is greater than ever before—729 as against 748 in 1923.

These class 1 mines (those producing 200,000 tons or over) produced only 47 per cent of the tonnage in 1923, but in 1927 their share increased to 65 per cent, with a corresponding reduction in the production of the smaller mines.

The Bureau's figures reflect the unequal competition between the Northern and Southern states under the old union wage scale. More significant than these upsets of fortunes, which are due to be righted by the lower wages now assured in the North, is the comparison of 1927 figures with those of 1923, the last year before the Jacksonville agreement.

In 1923 Old Man Coal was prosperous and fat, but sadly in need of exercise. The industry of 1927 was not so well fed, but it was more fit. Many inches had come off its waistline. It is some consolation to note the progress the industry has made toward attaining more normal weight. In 1923 there were 9,331 commercial mines; in 1927 the number had dropped to 7,008 mines. In 1923 the industry had a full-time capacity of 970,000,000 tons. In four years 140,000,000 tons had been liquidated and the capacity reduced to 830,000,000 tons.

The numbers on the payroll, much inflated in 1923, had fallen from 705,000 to 594,000, a reduction of 111,000. As a result of working off surplus fat the mines are able to increase their working time. The output per man per year rose from 801 tons in 1923 to 874 tons in 1927, in spite of an increase in total production caused by business recession in the latter part of that year. When business is consuming coal at the normal rate the output per man is now about 950 tons a year. This is a large increase over the period before the Jacksonville agreement.

Progress in mechanization is indicated by the growth of tonnage cut by machine, which rose from 66.9 per cent of the total in 1923 to 72.3 per cent in 1927. The tonnage strip-mined in 1927 increased to 18,378,000 tons, an increase of more than 6,000,000 tons since 1923. In 1923 the tonnage mined with loading machines was 1,879,000 tons; in 1927 it was well over 10,000,000 tons.

Times are still hard and Old Man Coal frequently is not certain as to where his next meal is coming from, but were he examined for insurance today he would be found a better risk than in the boom days before the Jacksonville agreement.

Ivan A. Given

Joins *Coal Age* Staff

Ivan A. Given, formerly research Fellow in Mining, West Virginia University, has joined the staff of *Coal Age*. Mr. Given who is 27 years old, is a native of West Virginia and received his mining engineering education at West Virginia University, being graduated in 1926. For the two years prior to his joining *Coal Age*, he was engaged in the collection of material on mining methods in West Virginia for a bulletin to be published by the School of Mines, West Virginia University, and received his master's degree in mining engineering at that institution this year.

In addition to the study of coal-mining methods in West Virginia, Mr. Given spent two years in the employ of the Island Creek Coal Co., Holden, W. Va., and has had extensive experience in first-aid, mine-rescue work and safety problems. He also is a member of the American Institute of Mining and Metallurgical Engineers and other professional organizations.

Hold New First-Aid Meet

Genter-Placita team won the first annual first-aid contest of the Western Slope First Aid Association, held Sept. 3 at Lincoln Park, Grand Junction, Colo. Somerset team was second, and the Palisade team took third. Eight teams competed.

Reorganize R. & P. Coal Co.; Robinson Retires

Reorganization of the Rochester & Pittsburgh Coal Co. became effective Oct. 1 following the acquisition of control of the Helvetia Coal Mining Co., which is a consolidation of the Pittsburgh Gas Coal Co., the Cowanshannock Coal & Coke Co. and the Brush Creek Coal Mining Co. The Rochester & Pittsburgh company, which has managed and has been sales agent for the three companies, will continue existing policies.

Lucius W. Robinson, chairman of the board, who has controlled the affairs of the affiliated companies for 46 years, has retired. He will devote his time to private interests after 51 years' activity in the coal industry. B. M. Clark continues as president and J. Noble Snider remains as vice-president in charge of sales. L. W. Householder has been made vice-president in charge of operations and Heath Clark has been named a vice-president.

What Is Intake Air?

In reply to a question addressed by Walter H. Glasgow, Secretary of Mines, State of Pennsylvania, as to what is the meaning of "intake air fresh from the outside" in Rule 77, prohibiting the operation of trolley locomotives in any gaseous portions of mines except in such air, Leon D. Metzger, Deputy Attorney General of the State of Pennsylvania, says, Oct. 1: (1) "That if a mine or portion of a mine has never at any time generated explosive gas in quantities sufficient to be detected by an approved safety lamp, or if it has not done so for a period of one year immediately preceding, then Rule 77 does not apply and electric haulage locomotives may be operated from a trolley wire," and, "(2) that intake air, fresh from the outside, within the meaning of Rule 77, is intake air which has not been contaminated by passing through any workings of a mine where explosive gas is being generated in quantities sufficient to be detected by an approved safety lamp."

Rex Jellico Team Wins

The Rex Jellico Coal Co. team, LaFollette, Tenn., took first prize in the first-aid contest held in connection with Miners' Day at Knoxville, Tenn., Sept. 29. Thirteen teams took part in the event, which was the fourteenth annual staging of the affair, given under the auspices of the Southern Appalachian Coal Operators' Association, Tennessee mine inspectors, East Tennessee Fair Association, Southern Appalachian Efficiency Association and the U. S. Bureau of Mines.

Second prize went to the team of the Kentucky Utilities Co., Pineville, Ky.; third, Valley Creek team of the Pruden Coal & Coke Co.; fourth, Mine No. 1 of the Pruden Coal & Coke Co.; fifth, Moore Coal Co. team, Devonia, Tenn.; sixth, Coalfield Coal Co., Coalfield, Tenn.

Coal-Mine Fatality Rate in August At Same Level as Year Ago

Accidents in coal mines in the United States in August, 1928, caused the death of 167 men, according to reports received from state mine inspectors by the U. S. Bureau of Mines. Thirty-three of these accidents occurred in the anthracite mines of Pennsylvania; the remaining 134 were in bituminous mines in various states. The death rate per million tons of coal produced during the month was 3.48 based on an output of 47,991,000 tons; the rate for August a year ago was the same, based on 49,399,000 tons and 172 deaths.

The death rate for bituminous coal alone for August, 1928, was 3.26 with 41,108,000 tons and 134 fatalities, and that for anthracite was 4.79, with a tonnage of 6,883,000, as compared with rates of 3.50 and 3.38, respectively, for August of last year, based on a production of 41,705,000 tons and 146 fatalities for bituminous, and 7,694,000 tons and 26 fatalities for anthracite. Thus, while the rate for the industry as a whole was the same for August of both years, the bituminous rate for the current month shows a slight decrease, while that for anthracite is somewhat greater than for August, 1927.

Reports for the first eight months of 1928 show that accidents at coal mines caused the loss of 1,429 lives as compared with 1,536 for the same period in 1927. The production of coal thus far in 1928 is 360,134,000 tons, showing a fatality rate of 3.97 per million tons of coal produced; that for January to August, 1927, was 405,274,000 tons with a fatality rate of 3.79.

On Aug. 9 of the present year an explosion occurred at Johnstown, Pa., which caused the death of 5 men, and another explosion on Aug. 15, at Coalport, Pa., resulted in the death of 13 men. These two "major disasters"—that is, disasters causing the loss of 5 or more lives—brings the number of such accidents for the first eight months of 1928 up to 11 with a resulting loss of 308 lives. There were 8 major disasters during the corresponding eight months of 1927 with a loss of 155 lives. The death rates per million tons of coal produced, based exclusively on these major disasters, were 0.86 and 0.38, respectively, for the 1928 and 1927 periods.

The rate for gas and dust explosions has been considerably higher this year than last mainly because of the heavy loss of life in a major disaster that occurred in May of the present year. Comparative rates by causes for the eight-month periods of 1928 and 1927 follow:

	Year 1927	Jan.-Aug. 1927	Jan.-Aug. 1928
All causes	3.704	3.790	3.968
Falls of roof and coal	1.907	1.856	1.808
Haulage	.586	.600	.572
Gas or dust explosions:			
Local explosions	.153	.156	.109
Major explosions	.258	.350	.855
Explosives	.183	.185	.136
Electricity	.167	.180	.164
Other causes	.450	.463	.324

John F. Daniel

Recently appointed by Governor Flem D. Sampson as chief mine inspector of Kentucky. He was named for a four-year term, effective July 1, succeeding William H. Jones. The new inspector's experience in mining covers both eastern and western Kentucky.

LEE KINCAIDE, of Springfield, Ill., for several years past with the Consolidated Coal Co., formerly a banker and coal operator in Kincaide, Ill., in the Springfield district, for many years, and prominent in the affairs of the Illinois Coal Operators' Association, died suddenly of acute indigestion in a hotel at Wentzville, Mo., on Sept. 13.

Coal-Mine Fatalities During August, 1928, by Causes and States

(Compiled by Bureau of Mines and published by *Coal Age*)

State	Underground											Shaft					Surface							Total by State	
	Falls of roof (coal, rock, etc.)	Falls of face or pillar coal.	Mine cars and locomotives.	Explosions of Gas or Coal Dust	Explosives.	Suffocation from mine gases.	Electricity.	Animals.	Mining Machines.	Mine fires (burned, suffocated, etc.).	Other causes.	Total.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Cage, skip or bucket.	Other causes.	Total.	Mine cars and mine locomotives.	Electricity.	Machinery.	Boiler explosions or bursting steam pipes	Railway cars and locomotives.	Other causes	Total.	1928	1927
Alabama	1						3					4													4	8
Alaska																									0	0
Arkansas																									0	1
Colorado	1	1										2													2	4
Illinois	1		3				1				1	6							1					1	7	2
Indiana	1		1									2													2	1
Iowa	1		1									2													2	2
Kansas																									0	1
Kentucky	5		2									7													7	34
Maryland																									0	0
Michigan																									0	0
Missouri	3											3													3	0
Montana																									0	1
New Mexico	1											1													1	2
North Dakota																									0	0
Ohio	2		1			1	1					5						1						1	6	3
Oklahoma	1		1	1								3													3	0
Pennsylvania (bituminous)	14	2	7	18			2		1			44													44	34
Tennessee																									0	3
Texas																									0	0
Utah																									0	1
Virginia	2		2	2								6													6	5
Washington																									0	1
West Virginia	21	6	10				4		2			43							2					2	45	38
Wyoming	1				1							2													2	5
Total (bituminous)	55	9	28	21	1	1	11		3		1	130			1		1	1	2	1			1	4	134	146
Pennsylvania (anthracite)	16	3	7	2		1					1	30				1	1	1					1	2	33	26
Total, August, 1928	71	12	35	23	1	2	11		3		2	160			1	1	2	2	2	1			1	6	167	
Total, August, 1927	91	4	24	18	5		9	1	5		4	161	3			3	1	2				1	4	8		172